By J. Arthur Thomson

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Science, Old and New

What is Man?

Heredity

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PREFACE

The aim of this book is to serve as an introduction to an all-round study of Man as Organism and Social Person. It is especially an exposition of the fundamental biological facts as they appear to a biologist who does not regard them as supreme. But it cannot be more than an indication of the kind of knowledge that every one should have of himself, for the subject of each chapter deserves a book.

In including scientific conclusions in the philosophy which we must all work out—each one for himself—it is important to have these conclusions accurately stated. This has not always been done, and the result has been unnecessary disharmony. It is the aim of this book to give a careful presentation of the facts known in regard to Man's Place in Nature, distinguishing the essential and certain from what is still open to discussion. It is the author's conviction that there can be no radical antithesis between empirical or descriptive for-

mulation, which is the aim of science, and the transcendental or philosophical interpretation which is characteristic of the religious outlook. Conflict cannot arise unless science leaves its "last" and becomes interpretative, or denies the possibility of interpretation; or unless theology trespasses in the field of concrete description. Another conviction which betrays itself here and there in this book is that the scientific method is not the only pathway towards an appreciation of reality. There is a right of way towards the truth through feeling and through obedience.

In 1922 the Senatus of the United Free Church College in Aberdeen did me the honour of inviting me to give for the third time the "Thomson Lectures"; and it was suggested that I should explain in a simple way how biologists regard man. This book contains the ten lectures as they were delivered, but it is of course to be understood that the Senatus of the College gave no imprimatur whatsoever. I have indicated a number of books which will be of use in continuing the studies here outlined.

J. A. T.

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What Is Man?

CHAPTER I

MAN'S PEDIGREE

WHEN we approach the difficult problem of Man's pedigree, we should have in the background of our minds a twofold desire, on the one hand, to be courageous in facing the facts; on the other hand, to think always nobly of Man and the height of his calling.

§ 1. MAN'S AFFILIATION TO THE PRIMATES

But what are the facts? There is "an all-pervading similitude of structure," to use Sir Richard Owen's phrase, between man and the anthropoid apes or the highest Primates. Man is specific, himself and no other, and yet he is anatomically bound to the gorilla and the orang. As Darwin says at the close of *The Descent of Man:*

"We must, however, acknowledge, as it seems to me, that man, with all his noble qualities, with sympathy which feels for the most debased, with benevolence which extends not only to other men, but to the humblest living creature, with his God-like intellect, which has penetrated into the movements and constitution of the solar system—with all these exalted powers—man still bears in his bodily frame the indelible stamp of his lowly origin."

"The indelible stamp of his lowly origin": this is a momentous conclusion, and although the ground is familiar, we must rapidly survey it again. What are the evidences of Man's affiliation with the Primates?

(A) Man has distinctive anatomical features, such as a chin and regular teeth, but they are unimportant compared with the great mass of resemblances between him and the Anthropoid Apes. Bone for bone, muscle for muscle, nerve for nerve, there is an all-pervading similitude—of structure. As Romanes said long ago:

"The close anatomical resemblance that subsists between man and the higher apes—every bone, muscle, nerve, vessel, etc., in the enormously complex structure of the one coinciding, each to

each, with the no less enormously complex structure of the other—speaks so voluminously in favour of an uninterrupted continuity of descent, that no one who is at all entitled to speak upon the subject has ventured to dispute this continuity so far as the corporeal structure is concerned. All the few naturalists who still withhold their assent from the theory of evolution in its reference to man, expressly base their opinion on grounds of psychology."

It was no small part of Romanes's life-work to show that as regards mental processes man differs from the most intelligent animals in degree, but not in kind.

(B) Man's body is a walking museum of relics—vestigial structures which are evidences of his pedigree. The little third eyelid, in the inner upper corner of the eye, larger in some races than others, and sometimes including a minute tell-tale piece of cartilage, corresponds precisely to the third eyelid of apes and monkeys, and points the way back to lower mammals in which the third eyelid is a well-developed structure used in cleaning the front of the eye. There are vestigial muscles arranged to move the ear-trumpet as a whole or in part; but these cannot be activated in ordinary

individuals. "Darwin's point" on the in-rolled rim of the ear is the remains of the original tip of the ancestral ear, and it is at the apex during a certain period of development. As Prof. H. F. Osborn remarks:

"Both in the muscular and skeletal systems we find organs so far on the down grade that they are mere pensioners of the body, drawing pay (i.e. nutrition) for past honourable services without performing any corresponding work."[1]

Many of Man's vestigial structures are trivial and only appreciable to the expert anatomist, but the mere fact of their number is eloquent. In his well-known book, *The Structure of Man: An Index to His Past History*,[2] Prof. Wiedersheim discusses far more than fifty bodily relics.

Wiedersheim quotes a paragraph from the anthropologist Broca, which has a certain picturesqueness:

"Pride, which is one of the most characteristic traits of our nature, has in many minds prevailed over the calm testimony of reason. Like those

[1] "The Contemporary Evolution of Man." *Medical Record*, Feb. 20, 1892.

[2] Trans. 1895.

Roman Emperors who, intoxicated with their universal power, ended by denying their manhood, and by believing themselves to be demi-gods, so the king of our planet pleases himself with the thought that the nature of the vile animal which is subject to his caprices cannot have anything in common with his own. The proximity of the monkey is to him inconvenient; he is no longer satisfied to be the king of animals, he desires that an immense unfathomable abyss should separate him from his subjects; and, sometimes, turning his back on the earth, he takes refuge, with his endangered majesty, in the nebulous sphere of the Kingdom of Man. But Anatomy, like that slave who followed the triumphal car, repeating the words, "Memento te hominem esse," comes to agitate him in this self-admiration, and reminds him that reality, visible and tangible, links him with the animals.[1]

(C) The development of the human embryo is closely similar to that of the ape. For a time they seem to travel along the same Primate highway, and then they diverge. But this is not inconsistent with the fact that the human embryo is from the first specific—itself and no other. Man climbs up his own genealogical tree, but specific throughout. In an early stage man has a two-chambered

[1] Quoted in Wiedersheim's *Structure of Man* (trans. 1895), p. 218.

heart like that of a fish; it becomes three-chambered like that of a frog; it becomes four-chambered at last. Ontogeny recapitulates phylogeny. Even the red blood corpuscles of the embryo are more amphibian than mammalian, being large and nucleated. But it is only in very early stages that the embryo of man could be confused with that of any other creature; and even in the early stages microscopical examination reveals *specificity*.

Lack of nutrition, or some similar deficiency, may bring about arrest of development; and children born with this handicap are often strangely simian in their features and ways. We should not regard them as reversions to an ancestral type; they are arrests of development which give us some glimpse of what the ancestral type was like. Thus the abundant hairiness of the six-months' unborn offspring may persist and develop in the adult.

(D) There is a striking similarity in the bodily life of man and ape, and the same diseases, such as tubercle and rheumatism, may occur in both.

Very striking is the experimental proof of blood-relationship, in a literal sense. Friedenthal points out that when the blood of a horse is transfused into an ass, that of a hare into a rabbit, that of an

orang into a gibbon, or that of man into a chimpanzee, there is harmonious mingling of the two. But when human blood is transfused into eel, pigeon, horse, dog, lemur or monkey (non-anthropoid), there is no harmonious mingling. On the contrary, the human blood serum behaves in a hostile way to the other blood, causing great disturbance, marked, for instance, by the destruction of the red blood corpuscles. Why is there such a marked difference between the two sets of cases? In the first set the organisms are closely related; in the second set they are not.

Another form of the same kind of experiment has been made by Uhlenhuth and Nuttall. Suppose the blood serum of a rabbit, which has had human blood injected into it, be added to human blood. It forms a precipitate. Now it forms *almost* as marked a precipitate when it is added to the blood of an anthropoid ape. This shows relationship. But take a step or two more.

"The reaction to the blood of the lower Eastern monkeys is weaker, that to the Western monkeys weaker still; indeed, in this last case there is only a slight clouding after a considerable time, and no actual precipitate. The blood of the Lemuridæ ('half-monkeys') gives no reaction, or an extremely

weak one, that of the other mammals none whatever. We have in this not only a proof of the literal blood-relationship between man and apes, but the degree of relationship with the different main groups of apes can be determined beyond possibility of mistake."[1]

§ 2. The Sifting-out Process

One of the reasons why the Darwinian view of the descent of man is regarded by many with repulsion, is that they do not take the trouble to envisage the facts with accuracy. They do not understand what one may call the sifting-out process of successive divergences. Even in a well-worked-out pedigree like that of the horse or the elephant, we cannot as yet arrange a linear series, though such there must have been. We have to deal with several collateral lineages, and stage 4, which is missing on the A line, may be seen on the B line, while stage 5, missing on the B line, may be seen on the C line. What we have to deal with are collateral lineages like the branches of a candelabra arising at different levels. Monkeys do not lead on to apes, but there was an ancestral stem which split into the monkey-line and the anthropoid ape-

[1] Prof. G. Schwalbe in *Darwin and Modern Science.*

line. Apes do not lead on to man, but there was a generalized anthropoid line which split into the modern apes and the Hominidæ.

Let us try to state the case clearly, for it is very important. In early Eocene ages, the Primate stock of arboreal mammals was differentiated from the other mammalian stocks, such as Insectivores and Carnivores. From this generalized monkeyish stock there diverged first the New World Monkeys, and later on the Old World Monkeys. But the main stem, we believe, grew on. In the Oligocene ages there diverged the branch of small apes, the gibbons; and later on, probably in the Miocene, the large apes, the gorilla, and the chimpanzee, while the orang was probably on a line of its own. The main stem, confessedly vaguely known, grew on as a humanoid stem. From this, as ages passed, there diverged, as we shall see, tentative men—Hominidæ, but not Homo.

The point is that no naturalist supposes Man to be descended from any living ape, still less from any living monkey. The scientific teaching is that Man is a scion of a stock common to him and the higher apes, the divergence of humanoid and anthropoid occurring, perhaps, between one and two million years ago.

§ 3. Man's Probable Pedigree

A brief reference must now be made to the prehistoric human species, so far as they are known.

(I) The remains of *Pithecanthropus erectus*—the oldest relics of Hominidæ—were found in 1891 near Trinil in Java. They included a skull-cap, three teeth, and a thigh-bone, found scattered over about 20 yards, but probably belonging to one person. The reconstruction from remains so fragmentary must be uncertain, but human anatomy is a very exact science, and the conclusions of experts have been subjected to much mutual criticism. Sir Arthur Keith speaks of the shadowy being as "human in stature, human in gait, human in all his parts, save his brain." The skull top is somewhat gibbon-like, and indicates a brain in some respects sub-human, especially in the cerebral region where memories are stored. The thigh-bone is modernized human and indicates erect posture. The teeth are distinctively human. On the whole, the facts suggest that *Pithecanthropus* represents an early side branch of the Hominidæ. Prof. W. K. Gregory suggests that the type had been "driven southwards away from the primitive centre of dispersal in Central Asia, by pressure of

higher races."[1] Above the beds with the *Pithecanthropus* remains there were stratified deposits 45 feet thick, and the geological age, according to Dubois, the discoverer, and others, is Upper Pliocene. Along with the *Pithecanthropus* remains there were found bones of over twenty kinds of mammals—*all extinct*—and these also point to the Upper Pliocene. A probable age was half a million years ago.

(II) The Heidelberg Man, sometimes called *Palæanthropus heidelbergensis*, is represented by a lower jaw found near Heidelberg after about twenty years of searching. It is a massive chinless jaw, ape-like till the teeth are looked at. But these are very distinctly human, though pointing towards the Neanderthal man rather than to *Homo sapiens*, the "modern man" type. The jaw was found about 79 feet below the surface of river valley sands, which include pre-glacial mammals, such as woolly rhinoceros and mammoth. According to Schoetensack, the discoverer, and some others, the geological age is Lower Pleistocene, or First Interglacial, perhaps 400,000 years ago.

[1] W. K. Gregory, "The Origin and Evolution of the Human Dentition," *Journal of Dental Research*, Vol. II, 1920, Nos. 1–4; Vol. III, 1921, No. 1.

The associated flints are Eolithic, that is to say, they show little or no trace of having been worked, and are therefore very problematical. They are very much bigger than indubitable flints, and if Heidelberg Man used them habitually, he must have been a very strong fellow.

(III) The third important relic is the skull of Piltdown Man, *Eoanthropus dawsoni*, from a gravel bed in Sussex, less than 4 feet thick. Fragments of a second specimen were afterwards found 2 miles off. The original skull, pieced together from fragments, is very thick-walled, with a rather steep but ape-like forehead, without prominent brow-ridges, and with a primitive simian-like brain-case. From the way in which the skull was balanced, an erect posture is deduced. But the surprising feature is the lower jaw, which has been, as Prof. Lull says, "a veritable bone of contention." The chinless front part and the canine tooth must be called simian, the posterior part and the molar teeth are human. Thus the Dawn Man of the Sussex Weald was a remarkable mixture of ape-like and man-like characters. Perhaps it should be noted that there are no remains of Anthropoid Apes in Britain, and, furthermore, that the Piltdown skull is not that of a modern man. The remains were

found along with those of mammals long since extinct, such as Mastodon and Woolly Rhinoceros, and they were associated with crude Eoliths. Many would refer the gravels to the Second Interglacial time, in the Lower Pleistocene. It is probable that this particular tentative man was drowned.

(IV) The next step brings us to Neanderthal Man, *Homo neanderthalensis*, so-called from a skeleton found at the mouth of a cave in the Neanderthal gorge in the valley of the Düssel, a tributary of the Rhine. Before that discovery there had been found the Gibraltar skull (1848), and there were two famous fossil men discovered at Spy, in Belgium, in 1886. Since then many remains of the Neanderthal Man have been found in France, Spain, Belgium, Germany, and Austria. Thus the type is well known.

He was a small man, standing about 5 feet 3 inches, and he slouched forwards. His skeletal features point, as Prof. Lull says, to "a clumsy, shuffling, loose-jointed being of great muscular power." His thumb does not seem to have been so freely opposable as ours is. The skull is very large, above our average; the vault is low and the hinder part broad and bun-shaped; the brow-ridges

are very strong; there is still no chin. The face was thrust forward like an ape's; the neck was very thick. The jaw is massive, and the teeth indicate a coarse vegetarian diet. It does not seem likely that the Neanderthal Man spoke much. The brain was large, but not relatively big in the important part, the cerebral hemispheres. He was a huntsman, especially after small game; he sucked the marrow bones and lived in caves.

Sir Arthur Keith says that Neanderthal Man showed "simian characters swarming in the details of his structure," but he was neither primitive nor anthropoid. He was a man, though not ancestral to us. He used fire; he was a skilled artificer of flints which had a style of their own called Mousterian; and he furnished his reverently buried dead not only with food for a long journey, but with "beautifully wrought objects whose surrender implied a very real sacrifice on the part of the survivors."

Neanderthal man was living in Europe towards the end of the last Glacial epoch. He had for his contemporaries many mammals long since extinct, such as woolly rhinoceros, mammoth, cave-bear, and cave-hyæna. Before he disappeared *Homo sapiens* had arrived, the culmination of the stem

from which *Homo neanderthalensis* had diverged. That, at least, is the interpretation generally accepted to-day.

In great part, probably, Neanderthal Man was eliminated; but to some extent his type may have been absorbed in the *Homo sapiens* species, for some Neanderthal traits still crop up in men from Holland to Ireland, from Shetland to Australia.

(V) The latest notable discovery is that of Rhodesian Man, represented by a skull and a good many bones from Broken Hill mine in Northern Rhodesia, and by part of the upper jaw of a second specimen. Full details are not as yet available, but the probabilities are that it represents a primitive type, more advanced than the Neanderthal Man, and yet not modern. Very strong brow-ridges dwarf the forehead; the skull is laterally compressed, not depressed, and of average size; the palate is very broad and rounded; the teeth show caries, a disease never before observed in a prehistoric skull. It should be noted that the skull is not fossilized, and that the associated animal remains are those of living species.

Postglacial remains.—We must continue the story for a little. During the Glacial and Interglacial times of the Quaternary or Pleistocene

epoch, there probably lived the Heidelberg Man, the Piltdown Man, and the Neanderthal Man. In the later Glacial times there are abundant (Lower Palæolithic) flints, showing man's handiwork. But the first skeletal remains of the modern man type that we are quite sure about are Postglacial, perhaps dating from 25,000 to 30,000 years ago, and some of them belong to a race that calls for special remark—the splendid Crô-Magnon race.

First found in Wales, afterwards in France, the Crô-Magnon people were remarkable in two ways—for their stature and for their art. The skeleton of an old man is a little over 6 feet 4 inches in height. The skeleton of a woman is 5 feet 5 inches, a little above the average to-day, but her cranial cavity exceeds that of the average modern man. The Crô-Magnon physique seems to have been magnificent, suggestive of the Sikhs or some types of Central Asia. There are no beetling brows, and there is a prominent chin.

But the other feature is their artistic skill, as displayed in the sculpture, engraving, and painting found on the walls of caves in the Dordogne region, the Pyrenees, and North Spain. These are chiefly representations of animals, and show that a high

excellence had been attained in the Upper Palæolithic, in all probability 25–30,000 years ago. But the Crô-Magnon race seems to have declined mysteriously, like so many others, though there are hints of them still among inhabitants of the Dordogne.

Very different from the Crô-Magnons is the Grimaldi type of Upper Palæolithic men, best represented by the skeletons of a woman and a boy in the Grotte des Enfants, near Mentone. Some of the features have been regarded as negroid—the low narrow skull, the flattened nose, the prominent teeth, and the poor chin; and it is possible that the Grimaldi men were invaders from North Africa who got a hold on Southern Europe for a time and then had to retreat before the Crô-Magnons.

There are many other remains of Postglacial prehistoric man besides the Rhodesian, the Crô-Magnon, and the Grimaldi types, but these are the most interesting. Let us sum up briefly. The modern man type is represented by Postglacial remains and implements of the Reindeer Man, undoubtedly *Homo sapiens*, 25–30,000 years ago. The genus Homo is represented by skeletal remains and by handiwork during later Glacial times, and

Neanderthal Man lived then. Distinctly older are the Piltdown and Heidelberg types, while *Pithecanthropus* probably goes back to the Pliocene. Some of the authorities, like Osborn and Keith, date *Homo sapiens* back to the Pliocene; and many would say that the Hominidæ diverged from the Apes in the Miocene, between one and two million years ago.

This summary may be useful:—

C. POSTGLACIAL.	Rhodesian, Crô-Magnon, Grimaldi, etc., 25,000 years ago (?).
B. QUATERNARY or PLEISTOCENE 4 Glacial, and 3 Interglacial times.	Neanderthal Man (4th Glacial Period), 500,000 years ago (?). Piltdown Man (2nd Interglacial Period). Heidelberg Man (1st Interglacial Period).
A. TERTIARY.	UPPER PLIOCENE. Pithecanthropus (?). MIOCENE. Hominidæ diverged from Anthropoid Apes, one to two million years ago. OLIGOCENE. Gibbons diverged. EOCENE. Divergence of Old World monkeys. Divergence of New World monkeys. Primates diverged from a generalized Mammalian stock.

The facts of the case indicate a successive divergence of branches from a progressive main stem, and the general idea does not depend upon the interpretation of particular fossil fragments. Or if "a progressive main stem" is too strong a phrase, we may say that from the generalized base of each successive branch there diverged another branch

which over-topped the one from which it sprang, and was itself in turn over-topped. Some of the twigs on the monkey branch are known only as fossils, and the same is true of anthropoid and humanoid twigs. We get an idea of tentative apes and tentative men, of ages of endeavour and sifting, without rest but without haste. To all will be evident the vulgarity of the half-truth that "man sprang from monkeys." To many it will be impossible to shut out the idea of an inherent purpose as the core of the world-process.

And yet there is a question that we must put to ourselves. There was a time when the dominant kind of man was the Neanderthal type. For the time being, Nature was crowned in him, but he did not last. He was a man who thought; what did he think as his own species dwindled and an upstart took its place? Is there a race of super-men implicit in mankind that will replace us as *Homo sapiens* replaced the men of Neanderthal?

To make matters as clear as possible, let us sum up at this point.

What is Man's zoological affiliation?—A stock common to Hominidæ and to the higher Anthropoid Apes.

Is any extinct type known which can be regarded as

the common ancestor of Hominidæ and the higher Anthropoid Apes?—This link is still missing.

Are there any antecedent types which must be regarded as humanoid, yet not of the modern man type?—There are divergent or collateral types, Hominidæ, but not Homo—*Pithecanthropus*, Heidelberg Man, and Piltdown Man—and there is *Homo neanderthalensis*, quite different from *Homo sapiens*.

What is man's antiquity?—That depends on what is meant by "Man." Most authorities believe that there are skeletal remains of *Homo*, not *Homo sapiens*, which cannot be less than half a million years old; but the divergence of Hominidæ from Anthropoids must have been much earlier—between 1,000,000 and 2,000,000 years ago.

Where was the cradle of the human race?—This is still unknown, but various facts point towards Central Asia as a probable headquarters. Among the reasons for this conclusion may be mentioned the antiquity of Asiatic civilizations, the Asiatic origin of most domestic animals, the Asiatic suggestion in some Crô-Magnon features, and the fact that the oldest humanoid remains (those of *Pithecanthropus*) are in Java.

§ 4. Factors in Man's Emergence

We must begin with a confession of ignorance, for we do not know much about the factors in Man's emergence. But there are various suggestions to be made which are worthy of consideration.

(*a*) Man belongs to an order which was moving in the direction of improved brains and increased gregariousness. There are some immensely strong Primates, such as the gorilla, but the majority depend for survival on their brains, their sociality, and their arboreal habits. If an ancestral humanoid stock suddenly mutated in the direction of a larger and more complex brain, that was a mutation congruent with previous advances in the Primates.

(*b*) Sir Ray Lankester has pointed out that in the Miocene times, when Hominidæ may have been separating off from Simiidæ, there was a great increase of brain in several other mammalian types, such as the elephants. Why this should have been so, we do not know. There may have been some penetrating environmental stimulus, and there may be something in the suggestion that when the general bodily framework has attained high specialization and considerable perfection, the open

path for further evolution is naturally found in improving the brain.

(*c*) Some say that it is begging the whole question to postulate a cerebral mutation—a brusque or transilient advance—for that is what has to be explained. But this is not a fair objection. Mutations are facts, illustrated, for instance, in the emergence of a human genius. We do not know how they come about, but it is quite legitimate in a working hypothesis to postulate their occurrence.

(*d*) Supposing a discontinuous or saltatory improvement in the brain, we can see how it would be favoured in a gregarious stock. It would be especially favoured in a social milieu if associated with considerable powers of language, which, again, is correlated with the erect attitude. The cleverer, more adaptable, kindlier, more expressive variants would get on best, and their type would gradually lead the race.

(*e*) Robert Chambers made the suggestion that a lengthening out of the ante-natal period of close partnership with the mother would favour the development of the brain. It means a safe period of development, sheltered from premature responsibilities; and it is interesting to notice that in the big-brained elephant the ante-natal life lasts

for twenty-two months. What a contrast to the hedgehog's month! The gestation period in the horse lasts for eleven months. What a contrast to the rabbit's thirty days! In monkeys a common duration is seven months. Now, a frequent kind of variation among organisms is what we may call a "temporal variation," that is to say, a lengthening out of part of the life-history and a shortening down of another part. This may be in some cases associated with changes in the activity of the ductless or endocrine glands, such as the pituitary body, which makes a growth-regulating hormone. We say, then, that a lengthening out of the ante-natal life would favour a synchronous improvement in the brain.

(*f*) When a creature has to begin very quickly the serious business of life, it requires to be well-endowed at birth. But being well-endowed at birth is apt to involve stereotyping of capacities. It is apt to mean more instinct than intelligence. On the other hand, if the young creature can live for a while a sheltered life, especially under the stimulus of some education by its parents, then it is practicable to be born with a more plastic brain, which can learn quickly and try experiments on its own account. A prolongation of safe infancy, so

characteristic of mankind, gives the brain time to grow without responsibilities, and the prolongation of the playing period, characteristic of mankind and many clever mammals, gives time, as Dr. Chalmers Mitchell has well shown, for experimenting and testing, for tentatives in self-expression.

What Sir Arthur Keith points out[1] is very significant, that

> "Man's brain is only about one-fifth of its adult weight at birth; that of the anthropoid is already two-thirds. Man has to be sheltered and educated; the anthropoid baby has to face the realities of life soon after birth. . . . By the end of the second year the human brain has reached two-thirds of its adult size; it has then reached the same relative degree of development that the anthropoid has reached at birth."

We see, then, that the human child with prolonged infancy and prolonged play-period would retain longer than in most cases what we might call "an open mind." In other words, it remains for an unusually long time very "educable," with ample opportunities for testing idiosyncrasies.

(*g*) Another aspect of this prolonged infancy has been emphasized by Fiske and others, that it would

[1] *The Human Body*, p. 37.

help in the growth of gentleness. It must be understood in all these cases that we do not contemplate the individually increased gentleness being entailed on the offspring, and thus accumulating generation after generation. This is possible, but it is more likely that a circuitous process occurred in this and in all similar cases. Germinal variations in the direction of gentleness occur. These succeed well in actual life; the offspring of the rough-handed die. The prolonged infancy is a sieve favouring variations towards parental care.

What, then, can we dimly discern as factors in Man's emergence. He belonged to a clever social stock; he diverged at a time when some other types were experiencing great increase of brain; he was probably in part a mutation, and he illustrates mutations still; a cerebral mutation would have special survival value in a social stock with the power of speech; the prolonged ante-natal life may be correlated with a high degree of cerebral development; a prolongation of infancy and of the play-period would favour educability of mind, as contrasted with early fixity; the prolonged infancy would also favour the development of gentleness in the individual and its evolution in the race.

We do not know that there is much more to be said at present, except to do justice to the influence of the arboreal apprenticeship of Man's ancestors.

§ 5. Arboreal Apprenticeship of Man's Ancestors

The stock from which Man diverged was doubtless for a time an arboreal stock, and it was probably among the branches that the bipedal habit was acquired. The consequences of arboreal life have been well studied by two anatomists. Prof. R. Anthony and Prof. F. Wood Jones, and they deserve consideration.

A typical mammal uses its fore-limbs as organs of support, but a new door was opened when in arboreal conditions the foot became the supporting and branch-gripping member, and the hand was set free to reach upward, to hang on by, to seize the fruit, and to hug the young one close to the breast. The hand was emancipated, and it remained in Apes and Man a plastic generalized hand, fit for anything. A horse has a very specialized hand; man's remains generalized.

The arboreal life, with a free hand, led on to an increased freedom of movement of the thigh on the

hip-bone, to the adjustment of the backbone as a supple yet stable pillar with a characteristic curve in the region of the loins, to an adaptation of musculature for balancing the body on the leg, to a strong development of the collar-bone in correlation with the free movements of the arms, and to a specialization of the thumb and big toe for branch-gripping purposes.

But the evolution of a free hand, able to grasp the food and lift it to the mouth, made it possible to dispense with the protrusive lips and gripping teeth. The snout region began to recede, and there was a correlated increase of the cranial cavity and a shunting forward of the eyes.

Another arboreal acquisition was a greatly increased power of turning the head from side to side; it became easier to locate sounds and to supplement the movements of the eyes. According to the anatomists, the arboreal life was connected with broad chests and flat backs, and with greater emphasis on midriff movements in respiration and less on the rib-movements.

Smell became less important, and touch was separated off from nose and snout and concentrated in the hand. It may also have been of considerable

importance that the hand was able to feel over most of the body.

"It is the freed hand," says Prof. Wood Jones, "which is permitted to become the sensitive hand, which now, so to speak, goes in advance of the animal and feels its way as it climbs through life."

The hand becomes important in corroborating the impressions gained by smell and sight. There is no doubt that in a series of present-day arboreal Primates we see a decrease in the importance of the olfactory region of the brain, and an increase in the region where sensory tidings from hand and eye and ear stream in—a region, moreover, towards which the originative seats of the outgoing motor impulses tend to become approximated. There is a good anatomical argument to the effect that arboreal life with a free hand was peculiarly favourable to the evolution of the most important part of the brain.

It often appears to outsiders that biologists argue in a circle. Thus, in this particular case, the biologists say that bodily changes led to improvements in brains; and, next minute, that better brains led to greater dexterity. But the biologists

are right. The fact is that we must think of the two sets of improvements going on simultaneously. As Prof. Wood Jones puts it:

"The evolution of the free and mobile forelimb in arboreal life may be likened to the production of a musical instrument—an instrument upon which it is impossible for the animal to produce a full range of harmony, or to appreciate the psychical connotations of this harmony, unless adequate cerebration is developed coincidently."

§ 6. The Descent from the Trees

The next step in the argument we owe to Prof. R. S. Lull.[1] In the Miocene or early Pliocene there occurred in Central Asia, the probable cradle of the human race, a continental elevation and a consequent increasing aridity of climate. The forest shrank and the pre-human ancestors had to come to earth. The collateral types in tropical forests remained in the main arboreal, and relatively unprogressive. But it was facing the difficulties of life on *terra firma* that was crucial in the emergence of Man.

Prof. Lull points out that the erect biped, with a free hand, descending from the trees, would have

[1] *Organic Evolution*, 1917, p. 672.

to become a hunter and an explorer. He would soon need shelter and clothing. He would tend to form temporary settlements when he found a favourable territory. He would begin to talk more, and after all, that is easy.

§ 7. Man as the Outcome of an Evolutionary Process

To what has been said of Man's affiliation with a generalized Primate stock and of the possible factors in his emergence, there are some who would demur in a radical way by insisting that the emergence is unthinkable without Divine intervention. Among naturalists, Alfred Russel Wallace maintained strongly that Man's origin demanded a special "spiritual influx," comparable to that which intervened when living organisms made their appearance or when consciousness began. As an organism, they say, Man evolved from the dusty mammals, but he also received a breath of divine life which Nature could not give, which Nature cannot take away. "There is surely," said Sir Thomas Browne, "a piece of divinity in us; something that was before the elements, and owes no homage unto the sun."

This position is not one that can be argued against on scientific grounds; it is a religious interpretation. The concept of a "spiritual influx" is beyond the scientific universe of discourse.

But there are some considerations to be borne in mind before the reaction to creationism is acquiesced in. It seems to suggest that the Power of God is not fundamental through and through but only intervenes now and again to help natural evolution over difficult stiles. It seems to suggest a certain imperfection in Creation, as if the world-process required special attention at critical junctures.

We do not urge that the special spiritual influx idea is counter to the idea of the unity of the organism, for its upholders, we understand, are convinced dualists, regarding "body" and "spirit" as readily separable realities. The idea of a Divine inbreathing which made a mammal man, or an animate body, in St. Paul's phrase, a spiritual body, seems to us to be counter to the idea of continuity in evolution, as if there were two worlds and not only one. But we do not urge this either, since the upholders of the creationist view frankly prefer their transcendental continuity to our empirical one. What we do urge, however, is that

it is very early to abandon the strictly scientific problem of Man's evolution.

§ 8. Solidarity with the Rest of Creation and yet Apartness

When we consider the affinities between Man and Anthropoid Apes—in structure, function, and development, we recognize that Man is solidary with the rest of creation. This is confirmed when we study what is already known of Man's pedigree and of the tentative men who diverged from the main line.

What of Man's apartness? We cannot make very much of the anatomical differences except the big brain, for there is nothing very momentous in the characteristic features of Man's chin and heel, teeth and great toe. In point of fact, not all types of man have a prominent chin, not all have a perfectly erect attitude.

But when we turn to the brain it is different. For no normal man has less than twice the cranial capacity of the orang or chimpanzee, and the average human brain weighs far more than twice the heaviest gorilla brain. Most of this great increase is in the part that counts for most, being

the seat of the higher mental activities, namely, the cortex of the cerebral hemispheres with its multitudinous convolutions.

This fine cerebral cortex, with its 9,200,000,000 nerve-cells, is the protoplasmic correlate of man's true insignia—his capacity for working with general ideas, for language, for strong social sympathies, and for self-consciousness of himself, as a personality with a history.

Many an animal has a fine brain, but none comes near man's. Many animals show intelligence (the power of perceptual inference), but we do not know of any that can be credited with reason (the power of conceptual inference). Many animals have words, but there is never more than a hint of language—the power of expressing a judgment. Many animals are kindly, self-subordinating, and social, but we cannot credit them with "thinking the ought," with holding up before themselves an ethical and social ideal. These are Man's prerogatives.

On the other side there is the sad fact that no wild animal is ever so cruel, so lascivious, so selfish, so perverted, so unhealthy as Man sometimes is.

It is an error to lay over-emphasis on Man's

apartness and slur over the fact of his solidarity with the rest of creation. For there is great value in recognizing the continuity of the great historic process, in discovering the significance of the ages of groaning and travailing, in understanding why the beast must lurk even in the best, in being assured by the deep-rootedness of our better selves, in knowing that it is an ascent not a descent that we have behind us. Moreover, an exaggeration of Man's apartness leaves him too much of a puzzle, without affiliation, unaccounted for, like "a moral Melchisedek."

On the other hand, it is an error to overemphasize Man's affiliation and slur over the fact of his apartness. We have a price to pay for the truth that there is in the Darwinian doctrine of Man's solidarity, and that tax is that we do not always think worthily enough of Man. Some people never get past talking of him as no more than a bipedal mammal with an unusually large brain and a strong herd-instinct. Of course, that is true, but how far from expressing the whole truth.

For Man at his best discovers the secret motions of things and uses his knowledge to bend Nature to his purposes. He seeks after the True, the Beauti-

ful, and the Good. He sends his tendrils to the stars!

What is man, that thou art mindful of him,
    and the son of man, that thou regardest him?
Thou hast set him but little lower than godhead,
    to crown him with glory and worship:
Thou makest him to have dominion over the works of
    thy hands; thou hast put all things under his feet,
All sheep and oxen
    yea and the beasts of the field,
The fowls of the air and the fishes of the sea
    and whatsoever goeth thro' the paths of the sea.
O Lord our Governour,
    how excellent is thy name in all the world!

—PSALM viii.

CHAPTER II

PRIMITIVE MAN

§ 1. Extreme Views of Primitive Man.
§ 2. An Attempt at a Picture.
§ 3. Factors in Man's Ascent.
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CHAPTER II

PRIMITIVE MAN

§ 1. Extreme Views of Primitive Man

There are two extreme views of primitive man—the early representatives of the genus Homo. On one view, primitive man emerged at a high level, endowed with great excellences; he fell from his high estate; in some peoples he has made good; but savages give us glimpses of further retrogressions. On the other extreme view, primitive man was very coarse and brutish, "stuccoed all over with quadrupeds," a dull creature, full of fear. Yet he tested all things, and held fast that which was good; he let the ape and tiger die more or less; savage tribes give us a glimpse of what primitive man was; many races pushed ahead of others.

Between these extreme views there is a sounder position—that primitive man expressed a mutation, a sudden uplift, separating him by a leap

from the animal, that he was marked by strong kin-sympathy, by notable intelligence, and by an incipient language. At the same time, he was handicapped by the hold the past had on him. Reversion was ever dragging evolution in the mud. On the other hand, the repulsive habits of some tribes, such as promiscuity, are relapses to the animal, not primitive traits of mankind.

Inclining to the second extreme, but with truth as well as beauty, is the picture Æschylus gives of primitive man, living in caves, without woodwork, without system, without seasons, without foresight, a dream-life without judgment:—

And let me tell you, not as taunting men,
But teaching you the intention of my gifts,
How, first, beholding they beheld in vain,
And hearing, heard not, but, like shapes in dreams,
Mixed all things wildly down the tedious time,
Nor knew to build a house against the sun
With wicketed sides, nor any woodwork knew,
But lived like silly ants, beneath the ground,
In hollow caves unsunned. There came to them
No steadfast sign of winter, nor of spring
Flower-perfumed, nor of summer full of fruit,
But blindly and lawlessly they did all things,
Until I taught them how the stars do rise
And set in mystery, and devised for them

Number, the inducer of philosophies,
The synthesis of letters, and besides
The artificer of all things, Memory,
That sweet muse-mother.

§ 2. An Attempt at a Picture

Prehistoric man had well-marked physical features. He was more or less erect—even *Pithecanthropus* was that, they say—and he was no pigmy. He had a big brain, especially in the cerebral regions concerned with thinking and speaking. His skull was varying in the direction of high forehead, reduced brow-ridges, reduced nasal prominence, reduced jaw-power, more chin. There was a tendency to greater uniformity in the teeth, as seen in the reduction of canines, but there was also a tendency to crowding out. He had a very free hand, generalized in structure, plastic in function. He had lost the opposability of the great toe to the other toes, a common feature in apes and monkeys. He had much less body-hair than the apes, but much more than the average man of to-day.

The physical features we have mentioned are indisputable; beyond that we deal with inferences. But some of these have a high degree of plausibility.

(*a*) Compared with the wild beasts whose bones are found along with human remains or weapons, man was relatively weak. The compensation was in his nimble wits and his capacity for co-operative enterprise. We must remember that many of the strong beasts—like cave-lion and cave-bear—disappeared, and that it was man who survived. He was both clever and kind.

(*b*) With modern man's annihilation of distance we are familiar, but primitive man had spread all over the world. As in the case of many widely represented animal types, we must ascribe man's world-wide distribution in part to the untold ages he had at his disposal. But we must make another inference, that primitive man was adventurous. We picture the patient trekking and the deaths in the desert, the discovery of the mountain-pass leading to an Eldorado beyond, the perilous voyages across the straits. While there were no doubt from the first what one might call sedentary types, primitive man with his restless brain was adventurous.

(*c*) Probably there was a time when primitive man used loose stones and sticks as his only instruments, but the discovery of the possibilities of flint-splitting came very early. That opened

the way to a variety of tools and weapons; it possibly revealed the spark that could set the dry grass on fire; it made it possible to fashion neat things out of bone; it opened the door to art—to drawing on the wall of the cave or carving on the mammoth's tusk. Our simple point is that primitive man was inventive.

(*d*) Another feature was surely variability. For while the question of races in mankind is very difficult, it is admitted by most anthropologists that they are numerous, and that they diverged from one another very long ago. Perhaps it is safe to say that there are over a score of well-defined human races; and there is very little to be said for the view that *Homo* had a multiple origin.

Thus, to sum up, there is justification for concluding that primitive man was clever, kindly, adventurous, inventive, and very variable.

§ 3. Factors in Man's Ascent

Given a big restless brain, strong kin-sympathy, a variable constitution, and all the world against him, did primitive man need more to prompt him in his ascent? Perhaps all we can do is to illustrate what these primary qualities implied.

First of all, man was not as strong as a lion or a gorilla, but he was no weakling. He was no acquiescent person, but insurgent. He was living too dangerously to be meek and mild. His loins were girt—metaphorically, at least—and his lamp was lit. He was self-assertive and a hustler.

But that is as far as we can go. For we venture to think that Huxley's picture is in parts exaggerated.

"In the case of mankind," he wrote, "the self-assertion, the unscrupulous seizing upon all that can be grasped, the tenacious holding of all that can be kept, which constitute the essence of the struggle for existence, have answered. For his successful progress, as far as the savage state, man has been largely indebted to those qualities which he shares with the ape and the tiger; his exceptional physical organization, his sociability, his curiosity, and his imitativeness, his ruthless and ferocious destructiveness when his anger is roused by opposition."

Now it will be noted that Huxley is dealing with progress "as far as the savage state," and that he admits the importance of sociability. But what seems to us to be lacking is adequate recognition of the survival-value of gentleness, self-subordination,

and mutual helpfulness. We suspect that those who had not more than a little of these qualities were eliminated.

Think, for instance, of the helplessness of the human infant, of its prolonged infancy, of the demands it makes on patience and gentleness. It has to be carried about; it has to be fed often. The anthropoid ape's brain is two-thirds of the adult size at birth; the human child's brain does not reach this proportion for two years. Think, also, of the prolonged childhood before the young creature can fend for itself, of the play period in which there is irresponsible apprenticeship to the business of life and elbow-room for testing new departures. Think also of the relative weakness of the individual man, or, for that matter, of the single family. Primitive man could not stand alone. Families had to live together within the community. The combinations favoured the development of emotional and intellectual strength among their members; and the incipient societary forms acted as sieves, eliminating the extreme individualistic variations, fostering the altruistic.

Language.—Elephants are large-brained mammals, of great intelligence, and very sociable. Why have they not evolved into man-like Proboscid-

eans? The answers are probably that there was a certain fineness of quality in the evolving human brain; that elephants were in various ways seriously handicapped, notably in being giants and very slow to multiply; and that an animal race is more liable than the human race to stand still when it becomes well adapted to the conditions of life.

But another part of the answer is that man's mutation included a great advance in the power of language, which added enormously to his stability and progressibility.

Language has had an interesting history. To begin with, among animals, the use of the voice was to utter a sex call. That is its only use in Amphibians. Among Reptiles it broadens a little; the young crocodile pipes to its mother, the snake's hiss is a danger signal. Among birds the use of the voice as a means of expressing and exciting love rises to a climax, but there is often a call from parent to offspring and from offspring to parent, there are danger signals, and there are sometimes half a dozen or more words. In Mammals the voice becomes even more dissociated from sex, and even more a social instrument.

In what ways did language serve as a factor in progress? It obviously made for safety and pros-

perity to be able to send definite news round the little community: "The leopards have gone off in the meantime, but there is a terrible storm coming." It made for the evolution of the finer feelings to be able to give some expression to them. As the shrewd French saying puts it: "One must not only love; one must say that one loves!" There must have been a means of social integration in the primitive song. Every boatman could correct the philosopher who sees no survival-value in musical talent. What was true of the "Marseillaise" was true in its measure of the songs of primitive man.

But there are deeper values in language. It allows men to corroborate or contradict one another in their judgments. It helps towards what Mach has called "the adaptation of thoughts to facts." What shall we say of the door it opened—in song and story—to reminiscence, to keeping memories alive, and thus to the building up of traditional lore and traditional sentiment? Deepest of all, however, is the value of language as an instrument of thought. For we need words or other symbols if we are to make mental experiments, beyond the very simplest: "If this, then that."

Permanent Products.—Modern man has developed such an extraordinarily rich system of social registrations—literature, art, architecture, institutions, instruments—that he is apt to forget that primitive man was just beginning to have any of these. It was a day of small things—a hut, a tool, a trap, a boat, a trophy—but they meant much. Whenever there began to be anything in the way of permanent products, the next generation started at a slightly higher level. Perhaps it is not far wrong to say that the cerebral registrations which we call the instinctive capacities of ants and bees have their human counterpart in external products.

To sum up. Among the factors in the ascent of primitive man we recognize the necessity for struggle *and* the necessity for gentleness and mutual aid, the value of language, and the importance of permanent products.

§ 4. Origin of Marriage

The word marriage strictly denotes a social institution, with legalized rights and duties, but we may use it a little more loosely to denote the antecedent habit and custom of living together permanently. This relation is common among animals at many

different levels, and monogamy or mating for life is sometimes illustrated. Thus we may apply the word monogamous among mammals to the reindeer, the seal, the hippopotamus, the gazelle, the squirrel, the mole, the mongoose, and so on. Among the higher apes there seems to be considerable diversity, for polygyny occurs; but groups of three are very common—the father, the mother, a young one.

The origin of mating for life or for some time is to be found, probably, in the success it ensures in rearing the offspring, especially in conditions when there are considerable risks. It is the father's office to be a protector, and in any case two heads are better than one. The diagrammatic picture is that of the male gorilla crouching by night at the foot of the tree, while the female and the infant are asleep among the branches. He is guarding them against the attacks of leopards. In some cases, as in siamangs, the father may be seen carrying the baby.

But in addition to the Natural Selection interpretation of the survival value of the lasting unions, may we not frankly allow something for love?

As regards mankind, there is every possible peculiarity, but the broad fact is the general occurrence

of marriage, from lowest to highest, and from the very first. Westermarck has subjected to destructive criticism the view that certain peoples live or have lived in a state of promiscuity without any family ties. As he says,

"The hypothesis of a primitive state of promiscuity not only lacks all foundation in fact, but is utterly opposed to the most probable inferences we are able to make as regards the early condition of man." "Among the lowest savages, who chiefly or exclusively subsist on game and such products of nature as they can gather without cultivating the soil or breeding domestic animals, the family consisting of parents and children is a well-marked social unit, with the father as its head and protector."

Another general fact of great importance is that all over the world, and at all stages of civilization, marriage is regarded as more than propagative. It involves the duty of supporting and protecting the wife and children, and in many cases the man who would marry must first of all prove his ability to feed and guard.

According to Westermarck, we may regard marrying as a pre-human habit, but justified when man

became man by its utility. Primitive man was a family man living in small communities. Until he became agricultural, he could not form a large group, except in very luxurious conditions. But while the isolated family was not practicable, there was a family life within the community. Man had to collect his fruits and roots and occasional animals in a particulate not wholesale way, and on economic grounds, family life was best. It was also indispensable for the welfare of the helpless infant and the protection and education of the child, who remains young so long. But just as in regard to higher animals, so *a fortiori* in regard to primitive man, we must recognize behind utility the reality of love, forging psychical bonds.

Marriage was a habit to begin with, but it became a custom, part of the rule of conduct. The transition was due to the tightening of psychical bonds. The man and wife came to be more attached to one another as they faced life and danger together, as they worked together, and cared for the family together. Having the children about must have helped to broaden the always more selfish paternal affection. The family began to be a satisfaction in itself—fondness grew into love. Of course, we are thinking of unsophisticated days

before a subtle complex of ideas had clustered round marriage. We are thinking of the gradual transition whereby, among simple folk, marriage and the family passed from the level of pleasant and useful habits to the level of customs or institutions with social sanction or regulation. There would be pity and kind deeds when children were left orphans, and the other side of this would be resentment when a man forsook his wife or family. As Westermarck insists[1]: "Public or moral resentment or disapproval is at the bottom of the rules of custom and of all duties and rights." There is a deep truth in the saying, "Marriage is rooted in the family rather than the family in marriage."[2]

It has been urged that the more or less enduring wedlock partnership between man and woman may have to do with man's capacity for "making love at all seasons," "his protracted tendency to procreation." But there are two reasons for not believing this. The first is that some of the finest examples of monogamous mating among animals are found where the pairing season is sharply punctuated. This is very noteworthy in the case of birds.

The other reason is given by Westermarck, who

[1] *Human Marriage*, 1921, p. 71. [2] *Ibid.*, p. 72.

makes out a strong case for the view that primitive man had a pairing season.

"Considering, then, that the sexual season largely depends on the kind of food on which the species lives, together with other circumstances connected with anatomical and physiological peculiarities, and considering further the close biological resemblance between man and the man-like apes (which have a sexual season), we have reason to believe that the pairing of our earliest human or half-human ancestors also was restricted to a certain season of the year."[1]

We must sit a little longer at the feet of Prof. Westermarck, to learn his conclusions in regard to the different forms of marriage—monogamy, polygyny, polyandry, and group-marriage. Polygyny is a better word than polygamy for denoting a man's marriage with several simultaneous wives; polyandry is the much rarer relationship of one wife with several husbands; and group-marriage, with which Cæsar seems to have credited (probably in error) the ancient Britons, is a community of wives along with a community of husbands who are usually brothers.

Taking the last first, group-marriage occurs

[1] *Human Marriage*, p. 81.

among some Tibetans, Todas, Santals in Bengal, Australian natives, and so on. By those who have given up the untenable theory of primitive promiscuity, an attempt has been made to put in its place group-marriage. But, according to Westermarck, to assume former universality of group-marriage "would be a mere guess unsupported by the knowledge we possess of many of the lowest races now existing."

Polyandry is also an exceptional form of marriage, yet MacLennan and others have regarded it as primitive, a view which seems almost excluded by the deeply-rooted jealousy of men. But it has prevailed in Tibet from time immemorial, and is common among Himalayan people and others living not far from the probable cradle of the human race. It used to be general in the interior of Ceylon, and among the Nayars of Cochin, Malabar, and Travancore.

What is the meaning of this exceptional form of marriage? It may be the result of a relative scarcity of women, which is sometimes the outcome of female infanticide. It may be prompted by economic motives, for it checks the increase of population and it keeps the family property together when the husbands are brothers. It may be

the expression of an extremely hard struggle for existence. Thus the Rev. John Roscoe tells us of the pastoral Bahima, who live exclusively on milk, that the individual man is so poor that his only chance of a wife is to club with other poor men, whether his brothers or not. They pool their cattle and have a common wife. Another consideration is that the wife may not be left alone. Sometimes polyandry expresses the desire for offspring. But all these factors may be at work elsewhere without any polyandry resulting. We cannot follow the matter further; it is enough to notice Westermarck's carefully reached conclusion that polyandry was never a general form of marriage. For our part we think that the fact of jealousy is enough to lead to this conclusion.

Polygyny is common in many parts of the world, especially among the well-to-do. It is distinctly a rich man's form of marriage. King Mtessa of Uganda is said to have had 7000 wives; in Ashanti the regal number is limited to 3333. But polygyny is not confined to the wealthy. It is in Africa, where the conditions of life tend to be luxurious, that polygyny is seen at its height, and it is more frequent among pastoral people and the higher agriculturists than among the hunters and the

incipient agriculturists. There is no doubt that polygyny was the rule in many archaic civilizations. The Mormons regard it as a divine institution.

What factors favour polygyny? A large excess of women tends in this direction, and the excess is readily brought about by great mortality among the men, as the result of tribal wars. But the deeper reasons are that many men find the restrictions of faithful monogamy tedious; they like a long tether, young wives, many wives. Sometimes they wish to make sure of an heir or of many offspring. Sometimes it is economically useful to have many wives. "If I have but one wife," the Zulu asks, "who will cook for me when she is ill?" This may be safely generalized.

Westermarck points out that

> "monogamy is the only form of marriage that is permitted among every people. Wherever we find polygyny, polyandry, or group-marriage, we find monogamy side by side with it. On the other hand, it is also in many cases the only form of marriage which is permitted by custom or law."

Progress in civilization up to a certain point is favourable to polygyny, but civilization in its

highest forms leads to monogamy. The chief reason is that

"the sentiment of love has become more refined, and in consequence more enduring. To a cultivated mind, youth and beauty are by no means the only attractions of a woman, and besides, civilization has given female beauty a new lease of life."

Furthermore, all reasonable men know that for the family, monogamy is best. There is little likelihood that civilized mankind will depart from monogamy. What civilized man requires to depart from is indulgence in polygynous habits behind a screen of formally monogamous marriage.

A reason for regarding monogamy as primitive is to be found in the probability that before the days of tribal wars the proportions of the sexes were approximately equal. Another reason is that primitive man had a hard struggle; polygyny was a luxury that came later.

We have merely skimmed a vast subject, and we have had to appeal to authority more than we like to do, but the general result is that we may with a clear intellectual conscience brush away the nightmare picture of primitive man as indulging in promiscuity like rabbits. He was a married man.

Nay, more, there is a very strong case for regarding monogamy as primitive. Generalizing, we venture to doubt whether there ever was a "brutal stage" in the evolution of man.

Perhaps it may be said that we are relying too much on the idea of man as a mutation or transilient variant, as a mammalian genius, in short. But even if the true story is that there was a gradual transition from Anthropo-Hominid to Hominid, and from Hominid to Homo, we are not in the least inclined to admit that brutal or brutish, or any such word, is applicable to the ancestral ape-man. We must dismiss from our thoughts the perverted or depressed domestic mammals, and think of really fine mammals like the otter or the ermine, in whose life there is much more to admire than to criticize.

§ 5. Early Discoveries

Among the early discoveries that meant much to primitive man we must give the first place to Fire. Its panegyric has been often written. Let us take a passage from Alfred Russel Wallace's *Wonderful Century*[1]:

[1] 1898, p. 2.

"Fire, in various forms and in ever-widening spheres of action, has not only ministered to the necessities and the enjoyments of man, but has been the greatest, the essential factor, in that continuous increase of his power over nature, which has undoubtedly been a chief means in the development of his intellect and a necessary condition of what we term civilization. Without fire there would have been neither a bronze nor an iron age, and without these there could have been no effective tools or weapons, with all the long succession of mechanical discoveries and refinements that depended upon them. Without fire there could be no rudiment even of chemistry, and all that has arisen out of it. Without fire much of the earth's surface would be uninhabitable by man, and much of what is now wholesome food would be useless to him. Without fire he must always have remained ignorant of the larger part of the world of matter and of its mysterious forces. He might have lived in the warmer parts of the earth in a savage or even in a partially civilized condition, but he could never have risen to the full dignity of intellectual man, the interpreter and master of the forces of nature."

It is probable that man utilized natural fire before he learned to make it for himself. In volcanic districts wood can be kindled at lava streams. A

lightning-struck tree may start a fire which is not allowed to go out, and is distributed carefully. It may have been in fashioning flints that advantage was taken of sparks to light some kind of tinder, but the general view is that this method originated after iron was made. This is often referred to about 6000 years ago, in postglacial North Africa. In many parts of the world the very tedious method of producing fire by the friction of wood against wood has been in common use, but it is likely that fire-making took root in a relatively cold climate where wood was abundant. The use of friction matches is not yet a hundred years old.

Another momentous discovery, the beginnings of which are hidden in obscurity, was cultivation. Nature's sowing is evident to the observant eye, why not imitate it? We can picture early man being struck with the big kernels of the wild wheat which still grows on Mount Hermon, rubbing away the chaff in his hands, blowing the grains clean, and then enjoying them. He would make up his mind to sow this wheat. But this was a prehistoric experiment. One of the earliest forms of cultivation was probably clearing away useless plants so as to give the valuable ones a better chance. This is a large subject in itself, and we are only concerned

at present with recognizing the importance of cultivation as a factor in progress. It gave man greater independence; it made storing possible in cases like cereals; it fostered foresight; and it opened the door to more people living together in a limited area. It helped towards a larger community; it helped to forethought in keeping seed; to enterprise in irrigation; to peaceful living.

Another factor of incalculable importance was the domestication of animals, and that had begun in the Palæolithic times, when along with the hunter they sometimes buried his dog. It appears that the dog was the first animal to be domesticated, but we do not know how it was done, or how the idea of doing it occurred to early man. It may have been that attractive young wolves were taken home to please the children! Playing animals are easily tamed. Some rude tribes are fond of pets, such as monkeys. According to some experts, the domestic dog has been derived from three different wild carnivores—the wolf, the jackal, and the American coyote.

It was not till Neolithic times, when the finer stone weapons and implements were fashioned, that early man domesticated horses, cattle, sheep, goats, and pigs. This meant a great increase in

that wealth which is a pre-condition of higher progress. It meant new responsibilities, more discipline in forethought, a growing sense of ownership, capital. It meant increased possibilities of transport and clothing; it meant the possibility of a larger community. But it is useful at leisure to think out the numerous ways in which domesticated animals have inter-penetrated the life of man. The case of the reindeer—half-tamed rather than domesticated—is a very instructive one. Nor is it trivial to recognize how the domestic dog, originally a guard of the house and a help in hunting, rose into a subtler partnership when herds began.

The using of stones as weapons, or even as implements, is occasionally seen among monkeys, but man alone is a tool-*maker*. But he doubtless passed through a tool-using stage, as the early eoliths suggest. Gradually he attained to hammer and club, axe and spear, borer and flint-saw.

"As to how simple mechanical powers were first learnt," Tylor writes, "it is of no use to guess in what rude and early age men found that stones or blocks too weighty to lift by hand could be prized up and moved along with a stout stick, or rolled on two or three round poles, or got up a long gentle

slope more easily than up a short steep rise. Thus such discoveries as those of the lever, roller, and inclined plane are quite out of historical reach."

It requires little imagination to picture something of their value long ago.

Also prehistoric was the wheel carriage or wheeled farm-cart. The wheels were probably, to begin with, very thick drums cut from tree stems, and fixed to the axle, which revolved. Tylor notes that we see this to-day in some toy-carts, in Portuguese bullock-carts, and in railway carriages. By and by, the axle was fixed and the wheels revolved on it. It is interesting to notice to-day, within a limited area, very different methods of running boats down into the sea—there may be rough and ready movable rollers, trees of small girth; there may be permanent rollers revolving in a fixture, and occurring at regular intervals; there may also be a boat carriage with wheels.

Among the early appliances must also be included the primitive pestle and mortar and the hand-mill or quern, still in use in various parts of the world. We must also think of the trap and the net, of the hut and the household utensils, and of clothing. But our main point is that we are bound to think vividly of early man as an inventor of the

first order, and to recognize that each new invention meant an enrichment of the social heritage. There might be centuries, of course, without a single invention; but there was a cumulative growth.

We venture to refer to two other inventions, the importance of which is familiar—the boat and writing. As Tylor says: "He who first, laying hold of a floating bough, found it would bear him up in the water, had made a beginning in navigation." The outlines of the story of successive advances may be read from what is to be seen to-day—the floating log on which a native sits astride and paddles with his hands; the scooped-out log or dug-out, and the mishaps that lead to putting on a keel; the partly burned-out tree trunk forming a canoe that holds many; the bark-canoe; the skin-canoe; the canoe of laced planks; the raft for heavy transport; the punting-pole; the paddle; and the oar; the primitive sail made by the North American holding up his blanket with his outstretched arms; the mat supported by a mast, and thus the fishing-boat—so momentous in opening up the world. The important point for our general picture is simply that it all happened before history.

Lastly, there was writing, an invention of the first importance, but a very simple matter to start

with—some pictorial mark indicating the direction the hunter had taken or what creature he chased, or telling whose property something was. Picture-writing came first, then the pictures became symbols representing the sounds of words that named things, and gradually writing grew. This is, of course, a long and intricate story, but what we wish here to recognize is that the invention of writing opened a new door—the way out of barbarism. It meant the beginning of registering useful information, or recording important events, of handing on rules apart from oral tradition. It meant that man had no longer to trust to his memory. It meant that he being dead yet speaketh. It is the boundary line between barbarism and civilization. It probably arose at least thrice—in Chaldea, in China, and in Guatemala among the Mayas. In some ways the greatest of early discoveries was the discovery of the year—the regular pageant of the seasons—an object lesson on a big scale of the Order of Nature.

§ 6. Our Contemporary Ancestors

Our picture of primitive man is built up of inferences, for we are dealing with great antiquity.

But there is an indirect way of getting some inkling of the truth by the study of simple peoples persisting at the present day. "To travel over space," it has been said, "is also to travel over time!" Simple peoples may be studied as if they were our "contemporary ancestors," as if they were "living fossils," like certain types of animals and plants which are evidently the lingering survivors of an old-world fauna and flora. This is the central idea of a well-known book, *Primitive Folk*,[1] by Elie Reclus.

Certain reservations must be made. Few really primitive peoples remain, for civilization has intruded and changed their ways, often upsettingly. The new conditions which have invaded a relatively simple tribe have sometimes been deteriorative in their very rapidity, which has thrown the natives quite off their balance. Besides, they have often been ruthless and thoughtless to an extreme degree.

Apart from the effects following contact with an incongruent civilization, there seems to have been occasional retrogression among the people themselves. It is easy for man to slip down the ladder, especially when the conditions of life rather invite

[1] 1891.

slackness. Evolution is not necessarily progressive. On the other hand we have the bold statement of Reclus: "I do not hesitate to affirm that in many so-called savage tribes the average individual is neither morally nor intellectually inferior to the average individual in our so-called civilized states."

But there is another consideration of great importance, that a study of simple peoples often gives an erroneous total impression, because of some conspicuous feature which is undeniably repulsive; and yet the repulsion is not always justified, for the feature that repels may have a very natural explanation. The sensory and æsthetic repulsion must remain; but the intellectual and ethical repulsion should disappear.

Let us take a perfectly clear illustration. In the Mergui Archipelago there is a remnant, perhaps 5000 strong, of an interesting people, the sea-gypsies. They are also called Mawken, which means "the sea-drowned folk." They were forced off the mainland on to the islands; they were forced off the islands into the sea; and they have to-day no fixed abodes on land. They are healthy, temperate, fearless, peaceful, monogamous, chaste, and kindly—a very attractive remnant. But their boat—which is their home—is repulsively malodor-

ous. Everything from fishes to pearl-oysters is cleaned in the boat, which is awash with evil-smelling slush. Because of this filth some would discount the good qualities of the sea-gypsies. But inquiry shows that the men make a living by diving for pearl oysters, and that the children play in the water; anything that would attract the sharks is fatal, hence nothing is thrown overboard. When the boat is cleaned it is cleaned on the beach. It is horrible, but it is intelligible.

In this connection it is a great pleasure to refer to the writings and work of the Rev. John Roscoe, a missionary with the eyes of an anthropologist. He is one of those who have taken the trouble to saturate themselves in the history and folk-lore of the tribes to whom help and teaching are given. He has probed into what seems to outside inspection simply horrible, and he has come to know what it really means. To understand all is to forgive all, but man's forgiveness is not so very important; to understand all is to be able to control and remedy. Along many lines Comte's saying is profoundly true: "One only destroys what one replaces."

It is interesting, though hopeless, to try to imagine the mind of primitive man. No doubt he

had very alert senses, gathering in tidings about his environment, getting to know it in detail, like a naturalist. His universe was not large, but he knew his universe. He did not easily lose his way; he had, like the ants, a strong topographical memory. He was not distracted, as we are, by a multitudinous torrent of impressions, till we become callous to most. Time was of no account, he let things seep in. If his outlook was parochial, it was precise. We are apt to forget how much depended on distinguishing the edible from the poisonous plant, the innocent from the deadly animal. In these matters the answer is either right or wrong, happily right or deadly wrong. Primitive man was no fumbler.

We feel sure that he enjoyed his sensory life, especially when he had shelter and enough to eat. A bit of a glutton he naturally was, for meals were problematical. After all, it is only within recent years that dyspepsia has forced civilized man to remove gluttony from his list of vices. Doubtless the primitive man often ate far too much, and suffered for it no doubt, and was cross. But what he oftener illustrated was the adage that a hungry man is an angry man. But he did not get angry over-much, for he lived in a community.

We fancy that the happy moments of primitive man were many, for we entirely disagree with reflecting modern slum conditions or *depressed* savage conditions on primitive man. He enjoyed himself when he had a comfortable cave with pleasant neighbours. He liked a sun-bath, as his very distant relations, the monkeys, do. A swim, too, for he was punctiliously cleanly. He kept in good heart and in good fettle, else he would never have succeeded, even with all his wits, in the battle *Homo* versus *Mundum*—won not by us, but by primitive man.

It is certain that primitive man must have been more nose-minded than we are. He knew where the leopard and where the antelope had passed by. Probably he was less ear-minded, for he was not a great conversationalist, and Nature's sounds, like the thunder, often troubled him. For a long time, as we have already suggested, he was very critical about his food, which means a keen sense of taste, for he could not take food on trust as modern man does. He enjoyed his feast-days, no doubt; he endured many fast-days. When he got a footing—even a temporary footing—he enjoyed near Nature and the pageant of the seasons. He called the months after the migratory birds. By

and by, from the mouth of the cave, he watched the stars—and pondered. Not very analytic, he did not know much about physical causation. He knew himself as cause, and built up an animistic world-picture.

No one with any liveliness of feeling and imagination can think of primitive men without gratitude. They gained so much which we enjoy. William James is extreme, we think, in his view of the rough animality of primitive men, but he gives fine expression to what our feelings should be.

"Bone of our bone, and flesh of our flesh, are those half-brutish prehistoric brothers. Girdled about with the immense darkness of this mysterious universe even as we are, they were born and died, suffered and struggled. Given over to fearful crime and passion, plunged in the blackest ignorance, preyed upon by hideous and grotesque delusions, yet steadfastly serving the profoundest of ideals in their fixed faith that existence in any form is better than non-existence, they ever rescued triumphantly from the jaws of ever-imminent destruction the torch of life which, thanks to them, now lights the world for us. How small, indeed, seem individual distinctions when we look back on these overwhelming numbers of human beings panting and straining under the pressure of that

vital want! And how inessential in the eyes of God must be the small surplus of the individual's merit, swamped as it is in the vast ocean of the common merit of mankind, dumbly and undauntedly doing the fundamental duty, and living the heroic life. We grow humble and reverent as we contemplate the prodigious spectacle."[1]

[1] William James, in *Human Immortality*.

CHAPTER III

EVOLUTION OF MAN'S MIND

§ 1. Evolution of the Nervous System.
§ 2. Evolution of Behaviour.
§ 3. Evolution of the Vertebrate Brain.
§ 4. Man's Nervous System and its Pre-eminence.
§ 5. Man and Animal.
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CHAPTER III

EVOLUTION OF MAN'S MIND

§ 1. Evolution of the Nervous System

Every one is agreed that we have an inner or subjective life of feeling and thinking, of remembering and imagining—a mind. Every one is agreed that this mental life *counts*, for the most powerful things in the world are clear ideas and good feelings. Almost every one is agreed that we cannot by any jugglery get mind out of matter in the ordinary senses of these words, though it may be that mind could emerge from a reality of which matter is the objective aspect. Every one is agreed that the psychical life is closely wrapped up with the organization and activity of the nervous system. A poorly developed brain means a low-class mind. A clot in the brain means a blot in the mind. Now, if we are agreed that there is a real inner life—the kind of activity, after all, that we are surest about—that this inner life counts

in imagination and in purpose, in idea and in emotion, and that it is closely bound up with the nervous system, may we not agree to differ about the still unsolved problem—What is the clearest way of thinking of the relation between Body and Mind, if it be really a relation?

If the mental life is closely bound up with the nervous system, it may be useful to consider the evolution of that system, which finds its present climax in man. It is the most intricate of all systems, but its evolution is very gradual, and if we are humble enough to go slowly we can reach some valuable conclusions, and see them clearly.

In the nervous system of a well-equipped animal like a bee or a dog there are three kinds of nerve-cells or neurons. There are those which receive tidings from the outer world or from other parts of the body—the receptors or sensory neurons. The scout-cells, we may call them.

Then there are nerve-cells that send out commands, to the muscles to contract or relax, to the glandular organs to secrete, to the blood-vessels to get larger or smaller. These are the motor or efferent neurons. According to their importance they are the major-cells, the captain-cells, or the like; we may call them executive-officer cells.

But there is a third kind of cell, which is intermediate between the receptors and motors, with one hand linked to the scout and another hand linked to the executive officer. These are the G.H.Q. cells, the adjustors, or internuncial nerve cells. The higher the nervous system the more adjustors there are.

In all this we have hardly mentioned the cells that do the actual work, the muscle-cells, the so-called "common soldiers" that fight the battles of life. They are often called effectors. But is not the general chain of events clear? A stimulus from the outer world, the excitement of the receptor or many receptors, the transference of the tidings to an adjustor or many adjustors, and the shunting of the message to the motors which give the effectors or muscles the command to act. It may happen, however, that the adjustors call up other adjustors, and these others, so that the motors are influenced in a complex way. The news may be pigeon-holed by the adjustors, or combined with other news, or the natural answer-back may be definitely prohibited, or, as the physiologists say, inhibited. The lower animals have relatively few alternatives in their behaviour. Given a stimulus to a starfish, you can often predict the

reaction that will follow; but you cannot tell how the cat will jump. The more the adjustors increase, the more alternatives there are. Man has the maximum of adjustors and most freedom, or, unpredictability.

Let us continue to be humble. When news comes to a member of a household he may act appropriately, at once and by himself. Now this corresponds to the simple level of life seen in sponges, where there are no nerve-cells at all. The muscles are directly sensitive to outside stimulus; they answer back themselves. There are no receptors, no adjustors, no motors—only effectors. A rap comes to the door, and one of the inmates opens it. This is the beginning of the long story of the evolution of the nervous system.

Now let us suppose that news comes to a member of a household, but instead of answering back himself he asks a servant to do what is necessary. He is a receptor, but he declines to be more. This corresponds to the simple level of life exhibited by such animals as sea-anemones. There are scout-cells or receptors that pass the news to muscle-cells, which contract. There is a diffuse superficial network of nerve-cells the fibres of which are connected with the muscle-cells. The member of

the household who heard the rap asks the servant (the effector) to open the door.

A fine instance of the limitations of this very low type of nervous system is given by Prof. G. H. Parker. If a tentacle on one side of the sea-anemone's mouth be given a little piece of meat, it grasps it and transfers it to the mouth. If it then be given a little piece of filter-paper which has been dipped in beef-juice, it will do the same—which is very unprofitable. If the alternation is kept up for a little, with the same set of tentacles, the sea-anemone takes the true food and the faked food equally well. But after eight to ten trials it has learned, brainless creature though it is, to swallow only the true food; it casts the paper-food into the sea. Now it is very interesting that if the same experiment be made with the tentacles on the other side of the sea-anemone's mouth, they will take true food and faked food indiscriminately. They have not profited at all by the experience of the other tentacles. This shows very clearly the disadvantage of there being no centralized nervous system.

The next step is this. A member of a household —a child, let us say—hears a noise. The child is the receptor. It tells its mother, who tells the

servant to open the door. The mother corresponds to the motor nerve-cell that gives orders. The servant is the effector or muscle. Now we find this chain illustrated in some of the simpler answers-back in the earthworm. A receptor or sensory neuron in the skin is excited by the vibrations caused by the light tread of a thrush's foot; it passes on the thrill to a motor nerve-cell in the nerve-cord; and thence an order goes forth commanding the longitudinal muscles to contract. Luckily for the earthworm, it is back in its hole long before we can say receptor nerve-cell, motor nerve-cell, and muscle.

These domestic analogies become tedious, but we need only one more. A child detects a smell of burning, and is uneasy. The child is the receptor. It tells its father, who is the adjustor, and the father telephones to the police-station for the fire brigade, but also tells his wife to instruct the servant to shut the door of the room from which the smoke was coming. This is seen in many of the earthworm's reactions. The receptors receive the tidings, they excite adjustors, which stimulate motors, and these set the effectors in operation. In principle the nervous system never gets beyond this.

§ 2. Evolution of Behaviour

The activities of the lower animals, such as jellyfishes or starfishes, are within a relatively narrow range. They can be readily described, and they are lacking in surprises. These lower animals, we say, have very few habits compared with bees or birds. What they show most characteristically are reflex actions. In virtue of a pre-established linkage between certain nerve-cells and certain muscle-cells, the sea-anemone closes its tentacles on a piece of food, just as we close our eye at the approach of a stone. A great deal of the life of these humble creatures is, as it were, pre-arranged for them; their constitution includes the answers to the ordinary problems of life. But there are two important additions to be made to this statement. The first is that these simple creatures occasionally do something original; they show some initiative; they make an experiment which is not along the line of least resistance, as in the case of a starfish attacking a sea-urchin—not an intelligent experiment, but an experiment. Moreover, they show the beginning of a capacity to profit by their experience. Secondly, there is a glimpse of mind, of a factor that we cannot describe physiologically.

It may only be the sea-anemone's local memory of having been cheated several times with blotting-paper: not much, but a beginning.

The evolution of behaviour seems to have proceeded on two main lines. On the one hand, there is an establishment of structural pre-arrangements for behaviour, inborn linkages of particular nerve-cells and muscle-cells, of such a nature that when the trigger is pulled the action comes off. Thus there have been established capacities for compound reflex actions. As to the origin of these, it is difficult to be certain. According to the Lamarckian school, these capacities become racially engrained by the cumulative transmission of the results of individual practice. It is difficult to get facts to corroborate this interpretation, and even the interpretation is difficult when we think of actions that occur only once in a lifetime, like the chick's use of its egg-tooth in breaking out of the egg-shell. As examples of these compound reflex actions, we may take the nestling's opening of its bill, and swallowing when the mother-bird brings its food, or the young mammal's sucking. Reflexes can be inhibited, as when the fugitive in hiding suppresses a cough, or when we avoid sneezing during a marriage ceremony. But when they have

begun they cannot be altered—they are stereotyped and involuntary.

But along with compound reflexes there is sometimes found, on a different line, a tentative kind of behaviour, a very simple kind of experimenting, as when an animal of low degree explores a pool for food, or when it tries one reaction after another in a difficult situation, such as getting right when turned upside down.

Then there are engrained "tropisms," obligatory adjustments of the body which tend to secure physiological equilibrium of the two sides. The animal behaves like a gyroscope-car, which has to keep balanced on a single rail. If some movement of the passengers throws it to one side, its gyroscopes secure that this is immediately counteracted. The elver going up-stream has to go straight on, for if it swim obliquely the pressure on one side of the body is less than that on the other, and this is automatically adjusted by differential muscular action. The moth comes within the influence of the candle, and the eye on the near side is more illumined than that on the far side. This sets up inequality of reaction in eye, brain, and muscle, and the inequality automatically tends to bring both eyes into equal illumination. But this usually

means that the moth is in the flame. These tropisms depend on inborn pre-arrangements. Yet along with tropisms there may be simple experimenting.

This brings us to the level of instincts in the true sense. These are inborn or hereditary capacities for doing apparently clever things—they need no learning; they are shared equally by all members of the species, except that there may be differences between the two sexes; they are always related to particular circumstances which are of vital importance, and thus they are apt to be futile if the circumstances are slightly altered. It is well for the procession caterpillar to obey the instinct to go straight on in Indian file; but it is not so well when the Italian boy makes the head of A touch the tail of Z. Instincts are very stereotyped. That is at once their strength and their weakness; but they may vary from generation to generation, and they may be affected by intelligence in the individual lifetime. Many a pigeon has so entirely handed over the brooding activities to instinct that it goes on sitting on nothing for a long time, though its two eggs are lying within sight a few inches away. But another kind of pigeon will retrieve the eggs, probably acting with a gleam of intelli-

gence. Instinctive behaviour considered physiologically corresponds to a long chain of reflex actions; but there are facts which suggest that, in many cases at least, there is dim awareness and a strong background of endeavour—in other words, cognitive and conative factors.

Instinctive behaviour does not seem to be on the same evolution-tack as intelligent behaviour. There is no learning, there is extraordinary woodenness, there is no understanding of the situation. We do not adequately understand instinct, but it is generally agreed nowadays that it is not a rudimentary form of intelligence, nor due to the lapsing of intelligence in regard to a routine often performed. It is the outcome of an established pattern of nerve-cells and muscle-cells, with associated psychical factors, such as racial memory.

All of a sudden in the life of a kitten, usually when it is about two months old, the stimulus of a moving mouse pulls the trigger of the killing instinct. The kitten bristles up its hair, it cocks its ear, it has a new look in its eye, it twitches its tail, it spits or growls, it sheathes and unsheathes its claws, it springs like a tiger, it catches the mouse by the back of the neck. This is a good example of a true instinct, to be kept in mind when we come

to man, for in reference to him the word instinct is often used in a fallaciously loose way.

Before we leave the case of the kitten, which has been carefully studied, we may notice that while imitation and education may assist in the expression of the killing instinct, they are not essential to it. The kitten does not require to learn how to catch and kill mice. But it is very instructive to notice that the normal time for activating or, so to speak, releasing the killing instinct is during the early play period. If the kitten remain without mousing experience, it will become more and more difficult to evoke the instinct. This doubtless accounts for cases where a cat will allow a mouse to perch on its back. The familiar sight of an adult cat toying with a mouse, catching it, setting it free, and re-catching it, is to be interpreted as a relapse into the playfulness of the kitten period.

According to Lamarckians, the capacity for instinctive behaviour is the outcome of the cumulative transmission of habituations. Practice makes perfect in the individual; suppose the acquired dexterity transmitted representatively generation after generation. That is all. But the difficulty is to find facts to corroborate the possibil-

ity of this entailment of individually acquired gains; and even as an interpretation the Lamarckian view has an obvious difficulty when applied to performances that occur only once in a lifetime, such as a caterpillar's spinning of its cocoon.

According to the Darwinians, the capacity for instinctive behaviour is the outcome of germinal variations—more or less orthogenic, i.e. persistently in one direction—which find expressions in improvements in the neuro-muscular arrangements. These improvements are tested by the individual, and those that are in a profitable direction tend to become typical of the race.

This brings us to the level of intelligent behaviour, which is often illustrated among birds and mammals. It differs from instinctive behaviour in requiring to be learned, in not being as such hereditary, in varying notably among individuals of the same species, and in being plastic. We know that a thrush will learn gradually how to open a snail's shell against a stone, which is quite different from the perfection with which a spider weaves its first web. We know that a dog carrying a basket of eggs, with the handle in its mouth, will push the basket through beneath the stile and jump over. We have seen the polar bear in a

"zoo" making an eddy with its paw so that the floating buns came within its reach from the rock. These are simple illustrations of intelligence.

We cannot describe intelligent behaviour without using psychological terms. We feel our description quite inadequate unless it includes a recognition of some capacity for mental experiment, putting two and two together, making a perceptual inference. Behind intelligent behaviour there is always a judgment of some sort—in animals, a very simple judgment. There is an adjustment of old means to a new end. What is inherited is the educable intellect; what occurs is rapid learning, a scrutiny of associations, occasionally a sudden perceptual inference. Intelligent behaviour, occasional in animals, is common in man.

Now, just as we have *racial* enregistrations in the structure of the body which we call reactions, reflexes, tropisms, and instinctive capacities, so we find, in the neuro-muscular system of the intelligent animal or man, *individual* registrations of intelligent activities often performed. These are intelligent habituations, implying an ease and smoothness in performance, a dispensing with the intelligent control of every step. We illustrate this in connection with musical instruments; we see it

in the dexterity of the shunting horse or the shepherd's dog.

The question is whether there is any hereditary continuance of these habituations—a difficult and undecided question. There is no doubt as to the heritability of the educable capacity, but whether the individual gains are in any way entailed is another question, which has been the subject of much discussion. It is difficult to devise test-experiments and to live long enough to see their results.

Finally, when we reach man we find rational conduct, in which a higher note is struck. An ant has been known after considerable prompting to utilize a miniature portable bridge in order to get across to its artificially insulated nest. We should be inclined to say that intelligence interpolated itself here into the routine of predominantly tropistic and instinctive behaviour. But when the engineers built the Forth Bridge there was an interpolation of reason into intelligent construction. For there was no possibility of building the Forth Bridge without general mathematical and physical ideas of an abstract kind. To use Romanes's useful phrase, there was conceptual inference or reason.

Now one expects to find hints of reason, in this technical sense, in the most intelligent mammals,

but so far as we know, it is man's prerogative. Of course, we must give up using these words loosely. "Did not that dog reason?" Yes, but it would be clearer to call it *perceptual inference.* "Was that not clever of the bee?" Yes, but it might be clearer to call it *instinctive dexterity.* "But surely that sea-anemone knew what it was about when it closed its tentacles on the worm." Yes, but it might be safer to speak of a *reflex reaction.* "But surely the Venus's Fly-trap was aware of the insect that it captured?" Yes, but it may be better to call its activity an *organic reaction*, for plants have no nerve-cells.

§ 3. The Evolution of the Vetebrate Brain

This is an intricate inquiry, far beyond our scope, but there are some general considerations of great importance which are readily intelligible. How does the brain of a fish like a skate or a shark compare with the brain of an average backboneless animal like an earthworm? The answer must be: In the great multiplication of the adjustor elements, the internuncial nerve-cells which shunt, store, and combine the messages sent in from the receptors. There is not the same inevitableness

of response to a stimulus, for the adjustors pass on the tidings to other adjustors, and these to others, with the result that memories are called up, feelings also and desires. Thus it comes about that the response to the trigger-pulling may be very much more complex than in the case of the earthworm. There are alternatives of response, which open the door to choice.

The brain of a fish, like a skate or shark, shows the same main parts as the brain of a dog—cerebral hemispheres, optic thalami, optic lobes, cerebellum, and medulla oblongata. What are the steps of progress that mark the brain of the higher vertebrate as an advance on that of the lower? One very notable advance is that the cortex or outer covering of the cerebral hemispheres becomes much more complicated. In the fish the cerebral cortex is almost wholly concerned with smell; it is called the olfactory archipallium. But in a dog there has been a new growth, a neopallium, which receives tidings not only from the nose, but from the eyes and ears, which also stores memories, which also is the seat of intelligence.

Not only does the fore-brain become progressively larger, so that it tends to cover the other parts; but in many mammals the cortex grows so

rapidly, as compared with the deeper parts, that it becomes crumpled or convoluted. These hills and valleys, or convolutions, greatly increase the surface of the cortex, which is really a very shallow layer. Within certain limits we may say that the larger the number of convolutions the cleverer the mammal; thus a rabbit has a very smooth brain, and the dog a much convoluted one, so that we see at once why the dog must catch the rabbit. This must not be pushed too far, since the same result as is reached by convolutions, namely, increasing the cerebral cortex, may be attained, if the skull permits, by a relative increase of the size of the cerebral surface. Some small mammals that have few convolutions are clever enough, and this may be interpreted as the result of a relative increase in the area of the cortex.

Another feature that marks progressive evolution in the vertebrate brain is the more intricate branching of the neurons or nerve-cells. The branches which arise from the nerve-cell serve to establish connections with other nerve-cells; and the more branches there are the more connections there may be. It is like complexifying a telegraphic system. To put it a little too simply, the multiplying of the inter-relations between nerve-cells

enables an animal, in its response to a stimulus, to take account of more things at a time. One adjustor cell rings up another, and that another, and the motor centre is influenced by a variety of tidings which come to it. When the tidings conflict we may have a hesitating answer-back. It is very interesting to find that the historical stages in the intricate branching of the nerve-cells, which can be traced as we pass from fishes to mammals, have their counterpart in the stages in the development of the individual mammals. To sum up: improvements in the vertebrate brain are seen in the development of the neopallium, the convolutions, and the inter-relations.

Prof. G. H. Parker uses what may be a useful metaphor. Suppose a material world in which things occurred bound up in groups of fives. We put the question: What constitutes ten? The only answer would be two blocks of five. This is the ordinary chemical world. To a particular question there is only one answer.

But a complex kind of matter like nervous matter is like a world made up of the digits, and to the question, What constitutes ten? there come five answers, all true: $9 + 1$, $8 + 2$, $7 + 3$, $6 + 4$, $5 + 5$. In protoplasm there is a degree of freedom

or alternative far greater than that in ordinary non-living matter.

Now carry the idea a little further to the complex nervous organization with its millions of nerve-cells, with a multitude of inter-relations, and we get a glimpse of what possibilities there are of permutations and combinations. There is an increasing experimental indeterminism. You cannot tell how the cat will jump. The issue in a particular case depends on our inherited nerve-patterns, on our past personal discipline, on our present mood, on our purposeful vision of the future.

§ 4. Man's Nervous System and its Pre-eminence

By far the greater part of man's brain consists of the richly convoluted cerebral hemispheres, which cover over the other parts. They are continued backward in the "brain-stem," consisting of what are called the optic thalami, the optic lobes, the pons, and the medulla oblongata. Above the pons there rises the cerebellum, which has to do with the regulation and co-ordination of movements; it is only about a ninth of the size of the cerebrum. The medulla oblongata gives off the majority

of the brain-nerves; it is continued as the spinal cord, outside the skull, down the canal of the backbone, as far as the "small" of the back, giving off thirty-one pairs of double-rooted spinal nerves, which receive messages by their sensory fibres, and transmit orders by their motor fibres. Besides the brain and its nerves, the spinal cord and its nerves, there is the sympathetic nervous system, connected with both. It is beyond the control of our will, but is profoundly influenced by our emotions. It sends branches to blood-vessels, hence our face pales with fear or flushes with joy, according as the vessels react to the sympathetic system which delicately controls them. The sympathetic system also gives off branches to the viscera and to a few muscles, like that in the upper eyelid, altering it according to our emotional state.

It is necessary to mention these facts in order to understand the fineness of man's nervous system.

(*a*) The most important fact is the relative reduction of the smell-receiving area and the preponderant growth of the part of the cerebral hemispheres that has to do with vision, hearing, speech, and memory. Man is a climax of a change towards eye-mindedness, which began in the Lemurs. Prof. Elliot Smith has made much of this. He

points out what a gain there was in *looking forward*, in a stereoscopic vision, in attentively focussing the eyes and concentrating the gaze. It reacted, he thinks, as a stimulus on the cerebral cortex. It promoted more precise discrimination, more delicate manipulation. It was, as we should say, a sieve that would foster germinal variations in these directions. Then there was a great increase in the area concerned with receiving sound-tidings. These steps of progress are represented by stages in Primates; they are corroborated by the early Hominid skulls.

(*b*) The brain shows marked division of labour. There are areas that have particular functions, e.g. in controlling the arm, the lips, the tongue; in receiving messages from the eye and the ear. There are areas which are believed to be the seats of memory and inference. There are areas to which we cannot refer any function. It was a great event when Broca, in Paris, discovered, in the second half of the nineteenth century, that the centre for speech is in the interior frontal convolution of the left side. It must also be understood that there may be important pathways connecting different centres in the brain. Thus the speech-centre which sends out orders to the vocal cords is connected

with the hearing-centre, which receives tidings from the ear; and if we are born deaf we must also be dumb.

(*c*) A third very important fact is that the cerebral cortex is intricate beyond telling. There are about 1,700,000,000 people living on the globe at present; but there are more than five times that number of nerve-cells in our cerebral cortex. For the number is estimated at 9,200,000,000. But all this multitude is estimated to weigh a little over thirteen grains, say half an ounce (to err on the safe side), and to occupy a space of less than a cubic inch. The cerebral cortex, if spread out, would cover about 2352 square centimetres, or a foot and a half square, but it is at most about one-fifth of an inch thick. The point is that in a small compass there are nine billions of neurons in a very definite arrangement, the seat of all the higher nervous processes. The strictly nervous part, for there are blood-vessels and connective tissue cells, as well as nerve-cells, in the cortex, weighs about $\frac{1}{5000}$ of man's body, and yet it rules the body, sometimes tyrannically, and it may move the world.

(*d*) We must try to form some picture of the bustle of the brain. Of course, we do not know what happens when we are thinking, but we can

form a dim picture of some of the things that go on From the receptors or sense-organs—and there are more than five senses—tidings from outside are pouring in a flood. The telephone-bell is always ringing, but we are callous to many of the signals. There are also tidings from within from various parts of our body, and the fewer of them we hear the better. To most of the tidings from without we pay no heed, we give no answer; the stream forms an eddy, this becomes gradually quiet, and another takes its place. But some of the impressions borne in leave their mark, their engram or memory, and many of these, perhaps a small fraction of the whole, can be revived at will. We enjoy afresh the dancing daffodils. Others cannot be revived except in unusual circumstances, such as hypnosis, when, strange to say, impressions may be reproduced which never passed through the focus of consciousness at all. It is probable that all memory has its seat in the cerebral cortex.

Now, given the raw materials that come in through the senses, and given an organized framework of nerve-cell connections, the child works with its materials, plays with them, pieces them together in different ways, establishes linkages which we call associations, builds up constructions

which we call fancies; and so the inner life begins. The kinds of things that can be done are determined largely by the hereditary pattern of the brain, with, of course, its correlate of hereditary talent.

But there is another aspect of the cerebral activity, namely, that orders are continually being sent out. We know the path of some from a certain cerebral centre, down a particular nerve, to particular muscles. The orders never stop, even in sleep, for, however perfect our rest, our muscles are very slightly active, and produce a little heat, else we should be very cold of nights. The orders vary greatly in intensity and peremptoriness. To a reflex stimulus, such as growing cold, an answer from the heat-regulating centre is given back with nicety, but without alternative, and without our knowing anything about it. That is at the one end of the inclined plane. But a man sees a vision, and all his life is ordered in a new way. That is at the other end of the inclined plane. Our point just now is simply to picture the brain as a receiving station of extraordinary business; a storing, shunting, co-ordinating station; and a headquarters from which commands come—trivial and momentous.

(*e*) Another very important fact is that the brain goes on growing so long, and that there is a remarkable sequence in the order in which the various parts are finished. Man's brain has only one-fifth of its future weight at birth; the anthropoid's has two-thirds. The child gets to this at the end of its second year. In its sheltered life it keeps an open mind.

(*f*) A noteworthy fact in regard to the vertebrate brain is that the number of nerve-cells is given at birth, and cannot be added to. If there be an injury to the brain, the function of the part thrown out of gear may be discharged by another. Within limits there is a possibility of vicarious functioning. But there does not seem to be any regeneration of cerebral tissue. This fact has two sides—a minus and a plus. The minus side is that a hopelessly over-fatigued or poisoned nerve-cell cannot be replaced by another, and this may affect a whole nerve-centre. Hodge's fine experiments on bees go to show that there is normal fatigue of nerve-cells which is readily recovered from by rest and food, that there is abnormal fatigue of nerve-cells which may be recovered from for a time, and that there is irrecoverable fatigue—the structural side of which has been described—

from which there can be no recovery. The cells of the bee's brain go successively out of gear, and the over-industrious worker-bee has a very short life.

But the plus side of the fact is that the brain remains as a very permanent part of the organization. Skin-cells are always being replaced; gland-cells are often replaced; blood-cells are used up and replaced; and so on. But the brain has great permanence. This is important in connection with the stores of the unconscious and also as affording a permanent home, as it were, for the personality.

Another fact of great importance, to be alluded to later, is that the cerebral and mental life is bound up with the bodily life in a more intimate way than we formerly supposed. If the thyroid gland goes out of gear, the growth of intelligence stops; in cases of great promise it may be nipped in the bud and perturbed. Other chemical messengers, which are sent out into the blood from the reproductive organs, are needed to open the buds of the finest flowers of human nature.

In what respects is man's brain pre-eminent? Because it carries to a higher power the size of the cerebrum, its convolutions, its in-

tricacies, its multitude of cells, and its intensity of life.

Too much attention must not be paid to *weight*, for the weight of the brain includes more than its nerve-cells; it includes blood-vessels and supporting tissue. Yet it is interesting to recall that the largest recorded human brain weighed 65-66 ounces, the average British brain is about 48 ounces, while the brain of the higher apes weighs about 12-18 ounces. The brain of a woman among the Australian aborigines might weigh only 36 ounces, twice that of the highest ape.

Too much attention must not be paid to *size*, and one must be careful to take into consideration the size of the body. A Newfoundland dog has a much bigger brain than a fox-terrier, but it is not cleverer.

What is very important in man's case, as compared with apes, besides the increased dimensions and complexity, is the fact that man's brain goes on growing for a much longer time than is true of the apes. It remains longer an open mind.

What is true of the pre-eminence of man's brain is still more true of man's mind. According to Bergson and some other philosophers, the

mind of man is incomparably bigger than his brain.

§ 5. Man and Animal

After this survey we are in a better position to consider the question of the mental difference between man and animals. We need not delay over the old-fashioned criteria that man is a tool-using animal, a wearer of clothes, a maker of fire, and so on. For these are expressions of something deeper—and that is the power of conceptual inference. Perhaps Romanes sounds a little old-fashioned nowadays, but it is always possible to understand what he meant, which is an advantage. In his *Mental Evolution in Man*,[1] he writes:

"It is a peculiarity of the human mind that it is able to think about its own ideas as such, consciously to combine and elaborate them, intentionally to develop higher products out of less highly developed constituents. This remarkable power we found—also by common consent—to depend upon the faculty of self-consciousness, whereby the mind is able, as it were, to stand apart from itself, to render one of its states objective to others, and thus to contemplate its own ideas as such."

[1] 1888, p. 396.

The big differences seem to us to be man's capacity for looking at himself objectively, for framing and experimenting with general ideas and controlling conduct in relation to them and for expressing judgment in language.

We have already emphasized the survival-value of language as a social medium. Here the emphasis is rather on its indispensability in the evolution and development of intelligence. We cannot play the thinking game without counters. In the animal's mind the counters are largely memory images and other reminiscences, but man has got at the algebra of inference by means of words. Of course, other symbols are useful too, as in mathematics and music. In various animals there are words, as in rooks and dogs—particular sounds which have a meaning, either expressive of an emotional state like anger, or denoting particular things. A particular sound may convey to another animal the tidings of available food, though not what the food is. But animals have no words for "universals"; nor do they rise to the level of putting several sounds together so that a judgment is expressed.

We may delay for a moment to notice the often-repeated statement that man makes progress

intellectually whereas animals stand still. But this is to misconceive the whole evolution idea. The animal kingdom displays an inclined plane of behaviour, and the mental aspect becomes more and more dominant. Moreover, no observations have been long enough continued to afford data in regard to the improvement or stagnancy of the intelligence of wild animals such as wolves or elephants. But what we know of the improvement of the wits of animals under man's tutelage shows that they do not stand still. Again, an animal is not likely to become cleverer than it needs to be; if it is getting on well, why should it wrinkle its brows or its brains? But, once more, how little can we say of radical improvement in human capacity within historic times; there has been diffusion of the thinking habit, but what precise statements can we make in regard to advance in actual capacity? For a detection of such advance, if it occurred, ten thousand years may be far too short a period. Some races have shown greater advances than others, pointing to innate differences in rate and intricacy of mental processes; and so it may be with certain animal races. Finally, man's progress is mainly outside himself, in his social heritage.

§ 6. Mind and Body

Returning to where we began, we doubt if we can contribute at all to the perplexing question of the relation of body and mind, if it is a relation.

There is no use arguing with the extreme mechanists who declare man to be an automaton. For no automaton could make a theory that he was an automaton.

There is no use arguing with those who declare that thinking and feeling, willing and imagining, are negligible foam-balls on a stream of protoplasm. For no foam-balls can alter the direction of the current as ideas can alter the flow of our life. Ideas have hands and feet, as Hegel said.

There is no use arguing with those who declare that the personality is autonomous, independent of the body, for we know how gradually the light of reason dawns as the brain grows, how gradually it wanes as the brain gets old, how the mental life blossoms out with the hormones brought to the brain, how the promising mental life collapses because the proper hormones from the thyroid gland do not arrive.

So we may continue eliminating impossibilities till we are left with troubled minds facing two

views. There is the dualistic view that the mind is to the body as the musician to his instrument, bound up with it but not thirled to it, affected by it but transcending it. There is the monistic view that the mind and the body (or the brain) are two aspects of one reality—sometimes Body-*Mind*, sometimes Mind-*Body*.

It is not difficult to find men of scientific distinction and noble outlook who are convinced dualists, who believe that the Psyche is the dominant partner throughout, and a reality that may last after the dissolution of partnership.

Similarly it is not difficult to find men of scientific distinction and noble outlook who are convinced monists, who believe that all psychosis has its counterpart in biosis, that increasing complexity of organization has allowed the emergence of an aspect of reality which in the simple form of life is seen only, as it were, in sparks, whereas in man, it expands into daylight, in some into a more or less perfect day.

We find then among intellectual combatants of to-day two schools, agreed as to the reality of the inner psychical life, and yet differing radically. Perhaps the inference should be that we must not worry over the question unduly, for it need not

affect our view of the mundane life of man. When such authorities are not agreed, one thing is certain: *that the scientific man has no right to close doors dogmatically*. There are many who feel sure from their own experience that there are doors that Science can never shut. As men of feeling, our prejudices tend to be in favour of the dualistic view; as students of science our prejudices tend to be in favour of the monistic view. Perhaps we should be content, without haste, yet without sloth, to go on inquiring, believing that we have not yet quite learned how the perennial question should be put.

CHAPTER IV

MAN AS A SOCIAL PERSON

§ 1. Man a Scion of a Social Stock.
§ 2. The Roots of Kin-sympathy.
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CHAPTER IV

MAN AS A SOCIAL PERSON

§ 1. Man a Scion of a Social Stock

We start with the supposition that man sprang from a gregarious stock. The large anthropoid apes are strong creatures and can afford to stand alone. They may go about in families, but they are not social. But primitive man was relatively weak, except in brains and goodwill, and our supposition is that he found strength in union, as many monkeys do. According to Brehm's story, the veteran leader of a herd of baboons will risk his life, facing sportsmen and dogs, in order to rescue a youngster who had been left behind. It is improbable that this baboon thought about risking his life, or that he objectified with any clearness what he was about to do; it is probable that he acted as many a simple man would do—impulsively and yet nobly. There is probably

much truth in the aphorism: "Man did not make society; society made man"; meaning by that not only that man's mind is in great part a social product, but also that pre-human society was a condition of the real man's emergence and progress. Some authorities still believe that the human family came first and then the tribe; it appears more probable that isolated families were impossible for Early Man. The family was a pre-human legacy, which persisted in human communities.

§ 2. The Roots of Kin-sympathy

It is probably legitimate to trace back altruistic sentiment to maternal affection. As Aristotle said, mothers love their children as being portions of themselves. They are flesh of the mother's flesh, and, as St. Paul said, a living creature must love its own flesh. The young ones give the mother pleasure; she loves them. Parental affection becomes engrained, in the course of natural selection, in the species. Thus even the normally sterile worker-ants and worker-bees are very maternal. The male loves the female, and in proportion as the psychical bonds strengthen and working together increases, the father becomes susceptible

to the charm of the young ones whom his mate cherishes. If hers, then his; and their nearness, their helplessness, strengthen the bonds of affection.

Sameness of constitution, an antenatal partnership, a feeling of property, the appeal of nearness, the appeal of helplessness, an indefinable pleasure in having the young ones about, the pleasure of being welcomed, so maternal care arises; it broadens to include paternal care; it takes the family in its folds; it spreads to kin. Can one believe in any origin of altruistic sentiment which does not start from the love of mates, the love of parents for their offspring, the love of offspring for their parents?

A strong kin-sympathy with a firm constitutional basis would, of course, be strengthened by secondary factors—co-operation in enterprise, standing together against a common danger, close contiguity in a limited area, close blood-relationship promoting unanimism. These secondary factors would help. Later on, there come psychical factors, the common tradition, and a totem bond, gradually rising into a religious bond. But our simple proposition is that the possibility of a community rests primarily on an altruistic sentiment, and that is an expansion of conjugal, and still more

of parental, and particularly of *maternal* affection. Man is literally mammalian.

§ 3. Primitive Forms of Society

There is a strong probability that after primitive man got his foothold, he lived in communities in the great Eastern grasslands, and from this centre spread everywhere. He lived in little pastoral communities with domesticated herbivorous mammals, whose wanderings he followed, cultivating, as Aristotle said, "a migratory farm." He had little in the way of permanent products, he had to travel light; he had little division of labour, for the tasks were simple and in common; the community was a small one, but a successful solution so far as it went. If the group became unwieldy, it had to split. Abraham and Lot were together for a while—a patriarchal community, but "the land was not able to bear them, that they might dwell together; for their substance was great, so that they could not dwell together." Thus the pastoral community could not be very progressive; yet it was a useful apprenticeship in sociality.

When agriculture began in a serious way, there was stability of tenure instead of nomadism; the

property might be divided among heirs, but it could not be separated; the community grew and a higher form of community, with more division of labour, began.

Or, again, in forest conditions, man got his livelihood by hunting small animals and collecting fruits. There is no possibility of herds and no use for a large family. Life is more precarious, but more stimulating. There is more marked division of labour between the hunting father and the home-making mother (though migratory hunting women have occurred, as among the bushmen). The waiting beside the baby for the husband's return is one of the beginnings of the home, and in her leisure the woman starts gardening and poultry-keeping, and other devices. Soon there are more reasons than one for her man coming home. But an isolated family is exposed to great danger, especially when the hunting expeditions lead to some distance, we may start with a small forest-community as co-eval with a hunting family.

We need not continue. In different conditions, different communities arise—composed of pastoral, agricultural, and hunting folk. There gradually arise different societary groups, with different folk-ways or customs.

There is a good sentence in Marett's *Anthropology*, that culture depends on social organization, and social organization on numbers, and numbers on food, and food on invention. So we find a psychical factor at the beginning and a psychical factor at the end. According as the invention led to different kinds of food—domesticating herbivores, sowing seeds, hunting and fishing, there are different possibilities of number, and so different possibilities of division of labour and organization, and different types of culture. And according as the food is wheat, or Indian corn, or rice, and so on, there are different societary forms.

Of course there are complications. Different forms arise according to the way of counting descent, by the mother's people, or by the father's people, but not by both, if the parents are of different clans. Thus the wife and her people may have supreme authority in one tribe, the father and his people in another tribe. And then there is the extraordinary semi-religious influence of totemism, the totem being the animal or plant or something which is the symbol of the social group's communion, an esoteric symbol of the common ideal, of the common "luck." We have said enough; different societary forms differ according to their

food-getting, their numbers, their way of counting descent, their communal mysticism—all factors co-operating.

§ 4. Survival Value of Society

The roots of sociality are to be found in kindly feelings—in the emotions of kinship. The recognition of the advantages of combination against common enemies or dangers is an after-thought, a very quick after-thought, perhaps; but the love of kin comes first. It is necessary, however, to ask how a simple societary form justified itself in the course of evolution.

(*a*) Union is strength: that is the first justification of a society. Small gregarious birds will mob a hawk; a herd of cattle may defy a lion. No doubt combined action pays in attack as well as in defence, as we see at all levels from wolves to ants. But for man, the society meant primarily more safety. As Darwin says: "the individual which took the greatest pleasure in society would best escape various dangers; while those that cared least for their comrades, and lived solitary, would perish in greater numbers." There was an elimination of the non-social.

(*b*) A society may make for the enrichment of the individual life. It allows of more division of labour; it means a capitalization of energy; it makes the prolongation of youth possible, so that the opportunities for trying new departures are increased. Not that a social system *necessarily* operates progressively, as we think of progress, for the ant-hill and the bee-hive depend on the existence of a huge caste of non-reproductive females, bound by repressed instincts into a socialistic servility. And the early industrial system depended on its proletariat. But what we can say is, that a societary form makes certain desirable things possible—greater freedom and fulness for the individual life; though it must be admitted that the same may be secured by a solitary organism provided it has—like a golden eagle or an otter—a very firm foothold in the struggle for existence. For a creature like man, with no weapons nor armour, until he made them for himself, living in a society was not only safety, it meant a more successful family and a fuller life.

(*c*) Another very important justification of a society is the possibility of registering racial gains outside the organism. A societary form, however

simple, is like an evergreen; its leaves do not all fall off at once. It is possible to have a sustained tradition of how things should be done. The beginning of this among animals is when the parents teach the children, all the alphabet of wood-craft, for instance; but the handing on of a tradition is more secure when there is a society. One should not call this "social heredity," but it seems a little pedantic to object to the useful phrase "social heritage." From the individual point of view it is his social environment; from the racial point of view it is a persistence of organization which is secured outside the organism.

The social heritage may include permanent products, such as a hive, a termitary, an ant-hill, a beaver village, and in these there is a registering of gains. It may also include a vocabulary which is continued from generation to generation. In man this rises to language. Without labouring the point we may say that there was great survival value for the simple human society in being able to hand on approved folk-ways or mores apart from the natural inheritance.

(*d*) Fourthly, there is another great value in a society, however simple. It implies a system of inter-relations in reference to which new variations

are tested. This is of enormous importance, especially if we cannot lean heavily on the transmission of acquired characters. Heritable new departures which arise from within are sifted on a social sieve, and this brings about a certain consistency in evolution. Let us take a simple example. There is a not uncommon and often very delightful variant among men—the happy-go-lucky type. There is a certain quality in his defects, but he is irresponsible, unreliable, unpunctual. He cannot be "lippened to," as we say in Scotland. Now it is easy to see that in most modern societies that type could never become dominant. There must be sifting out in relation to a certain standard—the framework of the society, the convention that engagements must be kept, the trust that we have in a man doing what he promised.

Life in society promotes mutual understanding, a tolerant give-and-take, a certain kindliness which is fostered by working together with other people towards a worthy end. This goodwill has, of course, its hereditary basis, but it is often very markedly wrought out in the individual. This has been going on for hundreds of thousands of years, and it must be admitted that the growth of goodwill is not rapid. The kindness acquired by the

parent is not entailed on his children. That is one side of the facts. But the other side is that the social tradition, which is against extreme individualism, has been operating, slowly but persistently, for ages in the direction of fostering variations that are congruent with it, and eliminating those that are too contradictory. It is in this slow but sure way that progress comes about.

§ 5. Evolution of Societary Forms

So far our argument has been: Man sprang from a stock in which sociality is common; primitive man had deep-rooted kin-sympathy, and he was not strong enough to live alone; primitive man required mutual aid, and he found it in simple societary forms; these justified themselves in the struggle for existence—for reasons both obvious and subtle; they took diverse forms according to food, numbers, kinship, and so on.

But how did societary forms progress—from the simple to the complex? What were the factors in the evolution of societary forms? There are two possible approaches to this difficult question: we may inquire into the evolution of pre-human societary forms, to see whether there is any light

there; or we may try to think ourselves back into simple conditions and try to reconstruct speculatively the deep factors of social progress, utilizing, in so doing, any hints we can get from present-day changes in our own society.

Let us think for a little of animal societies, justifying this appeal because there is a possibility of getting hints from remote forms of societary life, which have stood the test of time, and because one must keep in mind the solidarity of man with the rest of creation. He was a unique synthesis, a new integrate, and yet there were, and are, in him strands which go back to pre-human social organisms. A short excursus, though it may seem to some a waste of time, is justifiable.

§ 6. Social Animals

It is one of the great trends of organic evolution to form aggregates and integrates, depending probably on the organism's fundamental dynamic quality of accumulating energy acceleratively up to a limit. Colonies are formed, mere aggregates at first, sometimes moving as a unity. This is the social trend on the vegetative tack.

Then there are, on the instinctive line, the physi-

cally discontinuous large families of ants and the like, and the combination of families in a community—blood-relations with division of labour, living amicably, with a corporate life and an esprit de corps, forming a whole more than the sum of its components.

Then there are herds and societies of intelligent animals, like horses, wolves, monkeys, cranes, parrots. Sometimes there are conventions which must not be disobeyed, combination in defence, attack, and enterprise, the beginning of social tissue.

The advantages are many. Small creatures, individually contemptible, attain to safety. In combination, the members may accomplish what would be impossible to them in isolation. We see this when ants drag big booty to the nest, or wolves surround their prey, or beavers build a dam. There is division of labour; mutual dependence grows; psychical bonds strengthen. As the society grows it succeeds cumulatively; it gains momentum through tradition and external registration. The struggle for existence changes in character with the increase of mutual aid and sociality. In the process of sifting there must be, in some measure, a shielding of the individual within the society. Other

rewards besides survival are thrown in; the social milieu favours wits and kindliness.

There are different kinds of ant-community and different grades of family-life among bees. One would like to know what led to the advance from small to large, from simple to complex integrates. In most cases we have to deal with a large family of which the queen is mother; but many an ant-hill is a community of several large families. Two or three hints are available. It is plain that success is in some measure a function of division of labour, and division of labour means some measure of polymorphism, which rests on variability. The differences between workers and queen seem to be mainly results of nurture; the peculiarities of drones are linked to their sex; but there are sometimes several castes of workers and soldiers, especially among the termites. This suggests that a variety of gifts is useful; that a certain amount of heterogeneity is wholesome. If we may generalize, it looks as if a certain variability among individuals might be useful in contributing to the progress of a human society. In other words, individualities count. As we say, it takes many different kinds of people to make a world.

When the individuality is a very strong new departure, a commanding genius, then the social change may be momentous. So we reach the Great Men theory of history.

Perhaps it seems a waste of time to linger over social animals when our problem is social man, but we are clutching at straws. No one seems to have much that is very luminous to say about factors of social change.

There is a well-known seamy side, from the human point of view, in the bee-hive and the ant-community. They depend on an enormous number of suppressed females—the workers. These correspond to a proletariat, except that they are the progeny of the queen-mother, and are rarely themselves fertile. Among the termites the workers and soldiers seem to be suppressed males as well as females. We do not pronounce upon it—we are not wise enough; we merely wish to understand what it is—one of Nature's strange experiments. As the workers and soldiers do not usually "grow up," so to speak, they are not tormented by sex-impulses as the drones must be, and it seems to us that the maternal care of the non-reproductive worker ants and bees, and the protective vigilance of the non-reproductive soldier-ants and soldier-

termites, illustrate what one might call the shunting or sublimation of the sex-urge.

§ 7. Speculative Reconstruction

Leaving animal societies with their suggestiveness and yet remoteness, can we think ourselves back into the past and discover speculatively any of the deep factors that led to the increased differentiation and integration of societary forms?

The first factor was *geographical*, and it sounds at first too commonplace to be true: it was a condition of progress that increase in numbers came about within a limited and somewhat isolated area. Mere increase in numbers and spreading over a cultivable plain would not lead to increased differentiation or integration. But increase in numbers on a small island, or around an oasis, or in a glen might. We suppose the community to become large enough to have considerable stability in relation to other communities, and large enough to allow of considerable division of labour. Inbreeding would bring about stability of type and a similarity of sympathy. There cannot be a strong kin-sympathy in a hetero-

geneous community, whose members do not understand one another. But in the primitive community of insulated or isolated kinsfolk, there would arise division of labour and conventions regulating the give-and-take; permanent products would accumulate and tradition would grow. In an atmosphere of unanimism amid complexity, integration would naturally evolve to regulate division of labour.

The second factor, we believe, was combination in a common enterprise, which would vary with race and circumstances. For it is not in meditation, but in action, that a social consciousness grows. It might be to withstand a common enemy—animal or human; it might be to build a dike against the sea, or to dam a great river; it might be to combine for patient centuries on an irrigation scheme; it might be (there is no contradiction) to engage in a hazardous migration from a dry and parched land to one flowing with milk and honey. It matters not what, provided it be not unworthy, a common endeavour engenders a communal mind. Here, in part, is the kernel of truth in the view that warfare is an essential condition of progress.

The psychology of the growth of the collective

mind—by suggestion, by sympathy, and by imitation, as Prof. McDougall says, is an intricate inquiry by itself. We are concerned just now with the possible factors that brought suggestion, sympathy, and imitation into effective operation. And what we emphasize is the indispensability of common enterprise—whether its expression be pacific or defensive, subduing nature, or finding a promised land.

The third factor was division of labour. Increase of numbers in a limited area of some wealth (by which we always mean a command of energies) would lead to division of labour—extending what had been already initiated in the family. It is a familiar fact that among simple peoples and simple workers, such as crofters and fisherfolk, there are many activities, besides housewifery, that fall to the women. There are others which the children must discharge—and it is part of their education. When there is little margin in the struggle for subsistence it is imperative that there be division of labour. What was wrong in the early industrial age was not the co-operation of wife and children in the work of the head of the house, but that this was pushed to an extreme in unnatural and unwholesome conditions, both of environment and

function. Our present argument is simple, that the increase of population on the island or peninsula or glen that afforded good subsistence, naturally led to a spreading of division of labour from the family to the community. It made bigger and better things possible; and in certain cases—every plus has its minus—it led to ugly inequalities, such as the depression of the hewers of wood and the carriers of water.

Fourthly, the growing division of labour made it more necessary than before to have regulations, defining the give-and-take, securing that the body, now with several different members, continued to live as a harmonious unity. There began to be more elaborate folk-ways. And the folk-ways that justified themselves as making for welfare became mores, a code of conduct. Yet it has often been possible that a radically unsound set of mores, as in many savage tribes, has persisted, because it did not transgress the limits of viability. But the acquiescence with these unsound mores, such as free love and infanticide and killing off the aged and keeping slaves of near kin, has always handicapped the tribe, sometimes fatally.

We are inclined to think that when we have recognized—

(*a*) a geographical segregation in a prosperous area and increase of population there;
(*b*) an esprit de corps, based on kinship and fostered by common enemies and enterprise;
(*c*) division of labour and mutual dependence in the community; and
(*d*) the consequent psychical integration by means of folk-ways;

we have got near understanding how societies began and continued.

§ 8. Social as Compared with Organic Evolution

Prof. H. E. Crampton, a very thoughtful evolutionist, commits himself to the statement that "human social relations are biological relations." But this seems to us a little like saying that the relations between a pair of doves are physico-chemical relations. For we hold to the view that man was a new synthesis with new laws; and human society a new synthesis, with new laws. Prof. Crampton goes on to say: "Identical biological laws, uniform everywhere in the organic world, have controlled the origin and establishment of even the most complex societies of men." This

is what we venture to call a biologism; for, while biological laws are operative in human society, they are transcended by sociological laws.

Can we state how the venue changes?

(1) Animals have relatively little power, outside their own bodies, of strengthening their position in the struggle for existence, but man has much. He gets to himself appliances and instruments, engines and machines; and the dwarf bends the Titan to his will.

(2) If a number of non-social men were shipwrecked on a Robinson Crusoe Island, they *might* illustrate extreme individualistic competition. But the primitive society was based on kinship and kindliness, and from first to last the social sentiment counts. Natural Selection has no free sway. Many whom Nature would not tolerate get a chance in Society. Often this may be for evil, but it is a fact.

(3) Most animals have to get their food directly. It is as *great* rarities that we come across cases like the slave-keeping ants, which not only have their food collected by their minions, but have literally to be fed. In human societies, however, exchange of services is general and often very elaborate. In many cases the majority get their bread and butter

indirectly, in exchange for something else. This changes the situation greatly. Here, again, many who could not survive in wild nature, flourish in human society. They often flourish too well.

(4) Most animals have no inheritance outside of themselves, but in mankind there are many external legacies. Apart from individual stores handed on, there is the social heritage, the social environment in which gains are registered, e.g. institutions and art.

We see, then, that the human society introduces great differences—apart from human reason and language. There are the external appliances available for the community, there is the irrepressible social sentiment, there is the division of labour and mutual dependence, and there is the external heritage. It is plain that we cannot simply transfer biological formulæ to human society, if only for the reason that civilized man deliberately seeks to control his own evolution towards certain ends or values.

It would probably take a year's hard study to become reasonably familiar with the tribal mysticism wrapped up with totems. It would take another year to become reasonably familiar with the manifold social organizations now existing

upon the earth. It would take another year to become reasonably familiar with the characteristics of the different races, and one remembers from Oliver Wendell Holmes the characteristically scientific saying: "an entomologist? no, but a little of a coleopterist." It would take another year to become reasonably familiar with the activities of typical uncivilized communities.

Yet, as the bio-sociological geniuses, Spencer, Comte, Le Play, and, in our own day, Patrick Geddes, who has influenced thousands, have recognized, the data of the problem are on lines like the co-ordinates in geometry, quite clear-cut.

What are they, then? Organism, Function, and Environment; Folk, Work, Place; Famille, Travail, Lieu. Like Descartes' mathematical co-ordinates, like Darwin's biological co-ordinates, so the sociological co-ordinates must remain—Folk, Work, Place; and the whole of sociological inquiry must be in that framework. How have the people conquered the place? How has the place moulded the people? How has doing baulked dying, and how have surroundings enforced doing? How have circumstances prompted effort, and how have they prompted racial change? How have organismal changes prompted new departures,

alike in function and in environment? Such are the multitudinous questions that arise—all half-answered—but the point is that we now see clearly the framework within which Sociology must work. Of course each co-ordinate has its psychical side; and just as Man transcends Mammal, so Society transcends Man.

CHAPTER V

BEHAVIOUR AND CONDUCT

§ 1. Urges and Appetencies.
§ 2. Instinctive Behaviour in Man.
§ 3. The Rôle of the Unconscious.
§ 4. Evolution of Morals.

CHAPTER V

BEHAVIOUR AND CONDUCT

THE object of this book is to take a general survey of Man all round, in and out, from a scientific point of view, yet necessarily impressionist; and so we come to his behaviour.

Psychology is the science of behaviour, and it is plainly impossible to deal with it in one chapter! We must be content with a little mapping out.

§ 1. URGES AND APPETENCIES

Deeply rooted in animal nature are the primary urges of hunger and love, the expressions of needs which demand satisfaction. The animal is hungry, a state of dissatisfaction sets in, this awakens an urge to seek for food, and, according to the level of the animal, there will be associated with this urge various psychical accompaniments—conative and cognitive. According to some authorities,

such as Fouillée, every appetition involves at least a rudimentary cognition, unless it becomes habitual. There may be a strong desire for food and a determination to get it; there may be a memory of previous meals, or a picture of the kind of food most appreciated, or even a plan of campaign. These are the adjuncts of the primary urge of hunger. The hungry condition prepares the food-canal for digestion. If the satisfaction is long delayed—especially if a rhythm is disturbed—a state of irritation sets in. Yet the tendency to exaggerate the inexorableness of appetites should be corrected by recalling that to forget all about meals and meat is a common experience of people who live at a high level, or who love much, or of those on whom heavy responsibilities fall.

In many animals, there is laid down in the nervous system a pre-established linkage, which brings about a sequence of effective actions, related to nutrition—the result being instinctive behaviour. What the urge of hunger does is to pull the trigger of this pre-arranged concatenation of activities, and then the busy bee flies to the flower and the ant seeks for seeds, though it may be that neither of them ever saw a flower or a seed before. We are far from denying that there is a cognitive and

conative side to this instinctive behaviour, but the physiological side is more dominant. Sometimes, indeed, the tyranny of the urge is fatal. Thus certain ants, fleeing from imminent danger at the risk of their lives, are quite unable to resist a drop of honey. They stop and look back like Lot's wife, and that's an end of it. We say, then, that in some animals there is a twofold compulsoriness, first in the urge itself, and secondly in the pre-established linkage by which satisfaction is found. A caterpillar may be taken as a good instance of an animal whose whole life, until it draws near its great change into a butterfly, is one long obedience to the urge of hunger—satisfied on instinctively prescribed lines.

But there are other animals of the more intelligent type, in which the satisfaction of the urge is not stereotyped. The compelling hunger activates motor behaviour which is adjusted to suit the particular case, adjusted by intelligence. The adjustment may be a modification of an instinctive capacity or a novel combination of the simple reactive capacities of the organism. But the adjustment is in some measure reflective rather than reflex; there is an appreciative awareness of the situation; there is a finer point to the cona-

tion or endeavour. There is more than a blind impulse, there may be a desire for an end more or less clearly perceived, or, in man's case, conceived. A thrush flies instinctively, but it learns to open a snail's shell intelligently. A kitten kills a mouse instinctively, but it finds its way out of a maze by more or less intelligent learning. Man coughs reflexly, but he sets out to catch fish intelligently. When we speak of the behaviour following the hunger-urge, we mean the activity required to secure the food. When the food is available and the organism is very hungry, the mere eating may be almost reflex—even in civilized man.

In a famous paper, Sir Ray Lankester drew a clear contrast between the two main paths which the evolution of behaviour illustrates. On the one hand, there is the "small brain" type, seen at its best in ants, bees, and wasps, hereditarily endowed with a rich repertory of ready-made capacities of a more or less stereotyped kind. This kind of nervous organization is ready for action at once, requiring no education or apprenticeship, but its perfection of achievement is sometimes shadowed by woodenness, and the creature is often very slow to take a hint. It has little "educability."

On the other evolution-tack, as we have seen, there is the "big brain" type, seen at its best in birds, mammals, and man, with relatively few specialized instincts, but with great capacity for quick learning. It has great "educability," and it requires a learning period. In thinking of man's behaviour we must keep in mind four sets of facts. First, there is the clamancy of the primary urges. Second, there are hereditarily engrained generalized capacities or tendencies, a small number of specialized instinctive capacities, and reflexes. Third, there is the intelligent and rational control of activities, able to intervene at a juncture, or holding the reins more or less constantly. Fourth, there is formation of habits, individual neuron patterns, in which behaviour becomes facile or too facile. The clamancy of the primary urges may be terrifically increased physiologically by hormones which come to the nervous system and excite deeply slumbering memories, imaginations fair and foul. The clamancy may be increased psychologically by the emotional atmosphere that is created.

Some outside stimulus sets the elements of the neuron-pattern at work—we see a vivid picture, arousing memories and associations; but it also

creates an atmosphere of feeling—pleasedness, affection, dissatisfaction, disgust, fear, anger, and so on. From the physiological point of view we have to recognize the change in the heart-beat, in the breathing movements, in the skin muscles, the peripheral blood-vessels, the sweat-glands, and the glands of internal secretion. In the emotional reaction after the stimulus the sympathetic nervous system or autonomic nervous system plays an important part. The stimulus that excites the spinal cord and the brain, overflows, as it were, into the sympathetic nervous system, changes occur all over the body, and these are reported back to headquarters. Or, at a higher level, it may be that the original stimulus to headquarters excites a strong emotion, the physical correlate of which is an involuntary nervous discharge which affects the sympathetic nervous system through the brain or spinal cord, the sympathetic system sends the news through the body, and the bustle grows; finally, there is a repercussion on the cerebral excitement, and this adds strength to the emotion.

As we have said, a clamant urge is strengthened physiologically by hormones and psychologically by emotion; and its demands for satisfaction may

conflict with ethical standards which we have made our own or with the conventions of the society in which we live. This is an old problem with which St. Paul, for instance, was familiar:

"I want to do what is right, but wrong is all I can manage; I cordially agree with God's law, so far as my inner self is concerned, but then I find quite another law in my members which conflicts with the law of my mind and makes me a prisoner to sin's law that resides in my members. Thus, left to myself, I serve the law of God with my mind, but with my flesh I serve the law of sin." [1]

Then St. Paul goes on to say something very remarkable.

As the wise poet said, "When philosophers are disputing, hunger and love solve the world's problems." Or, again, "Why do the people strive and cry? They will have food; they will have children, and bring them up as well as they can."

The importance of the primary urges of hunger and sex is obvious.

In the lower reaches of the animal kingdom, much of the life is this: the urges pull the trigger

[1] Romans vii. 21, Moffat's translation.

of instinctive capacities or sometimes reflexes, the result is satisfaction. There is an interesting theoretical point here. Some authorities, like Fouillée, believe that every appetition involves a rudimentary cognition; in individually formed habits the cognitive element tends to lapse; if individually acquired habits could find representation in the germ-plasm, then reflexes and tropisms might be end-stages, not beginnings. But there are too many "ifs" here.

In the higher reaches of the animal kingdom, much of the life is this: the urges pull the trigger of intelligent devices or individually acquired habituations which bring satisfaction.

In man, the same is true. But three great differences arise. (1) The cognitive element increases, the affective or emotional accompaniment is more complex, the conative bending of the bow is criticized and controlled. In repression there is active barring out of disturbing mental elements from the focus of consciousness. (2) There is a possibility of sublimating energy into channels higher than the primitive; as always happens when sex-passion is replaced by love, or when the sex-urge is socialized. The opposite of this is regression, when the energy is diverted into an old and more

primitive channel, the ordinary course of the stream of behaviour having been blocked. A recent writer in "The Times" says: "The history of civilization is in considerable part the history of the progressive differentiation into higher forms of the love-impulse in man, with a corresponding tragedy of collapse when the struggle to sublimate is a failure. We have to see to it," he continues, "that the struggle—never an easy one, as we all know—shall be carried on in the best possible conditions for success."

Now, one of the conditions of success is implied in the third differentia of man, namely, that his life is swayed in great part, not only by the primary urges, but by what old-fashioned people call purposes or ideals, what new-fashioned people call non-repressed ego-complexes. These consist of groups of ideas, strivings, and feelings (often clustered and unified into sentiments), and they enter the focus of consciousness together, and seem to act, so to speak, as a unity. One man's life is mainly dominated by the purpose of getting rich, another's by the ambition to create beauty, another's by a wish to make history, another's by striving to get things clear, another's by a passion for holiness.

§ 2. Instinctive Behaviour in Man

By "instinctive behaviour" in zoological terminology is meant something fairly definite. It means a concatenation of precise doings dependent on the activation of hereditarily pre-established neuromuscular linkages. On its inner side it may be associated with some cognitive awareness of an object, some feeling in regard to it, and some impulsive striving or endeavour to do something in relation to it, e.g. catch it or avoid it. In its second month a kitten that has played with its mother's tail and chased a wind-blown leaf, sees for the first time a mouse run past. This serves as the liberating stimulus of a capacity for instinctive behaviour. In an instant the kitten becomes a beast of prey. There is a new expression in its eye, it cocks its ear, it bristles up its hair, it sheathes and unsheathes its claws, it springs and catches the mouse by the back of the neck. Now, that is instinctive behaviour, and we wish to plead for using the term in this zoological sense and in no other.

The question is, what does man show corresponding to the instinctive behaviour of the kitten in killing the mouse? To our thinking, the right

answer is: "*Very little.*" This answer is at variance with most of the authorities, and must be justified.

If we turn to Prof. McDougall, for whose work everyone has the greatest respect, we find that he recognizes seven principal instincts in man, each of which is associated with a specific emotional excitement. There is the instinct to flee from danger, with its associated emotion of fear. But our behaviour in face of danger is very varied, it is often very stupid; often we cannot flee at all; there is nothing specific in our answer-back; the lady climbs on to a chair in face of a wild beast—namely, a mouse, and the man runs into a house to avoid the bomb. Surely we have to deal with a hereditarily determined *generalized* type of reaction. If these are instincts, they are very blunt-pointed.

There is the instinct of repulsion with its associated emotion of disgust, the instinct of curiosity with its associated emotion of wonder, the instinct of pugnacity with its associated emotion of anger, the instincts of self-abasement and of self-assertion with the emotions of subjection and elation, the parental instinct and the tender emotion. These are the seven primary instincts.

Let us take the parental "*instinct*" as another illustration of our criticism. It seems absurd to deny it, and yet, are we thinking clearly? The mother's love is plain, that is an emotion, but are we sure about the instinctive maternal behaviour in mankind? The bird builds a nest, that is instinctive parental behaviour, does the human mother do anything of this sort? The mother Sphex-wasp lays up a larder of paralyzed insects for the use of her offspring which she never survives to see; that is instinctive maternal behaviour, does the human mother do anything of this sort? She learns what to do intelligently or imitatively, and the fact that she has no limits to her tender care does not prove that her behaviour is instinctive. What, then, is it but intelligent behaviour based on an inheritance of generalized reaction-possibilities? We believe that the mother's dexterity in carrying her infant about, for the whole day sometimes, is easier to her because millennia of human mothers and pre-human mothers did the same, but we should not call her nursing instinctive. It is very variable, it differs greatly in different races, it is often mixed up with strange customs. It has not the smack of instinctive behaviour.

To the seven primary instincts Prof. McDougall goes on to add the sexual instinct or instinct of reproduction. But here, again, what is characteristic of man is his *poverty* of sex-instincts. The nightingale's song is instinctive sex-behaviour; the blackcock's tournament is instinctive sex-behaviour; the savage combat of the stags is instinctive sex-behaviour; but has man the counterparts of these on an instinctive plane? He sings, he dances, he wears his lady's colours and fights before her in pageant, but that is all intelligent. In the courtship of the Great Crested Grebe there is a ritual expressive of and provocative of love—using this word advisedly because the psychical element is so strong; but it is prescribed ritual, the same for all except in minute details which indicate individuality; it is instinctive behaviour. Where man has ritual in this connection it is prescribed, not by inborn instinctive pre-arrangements of the brain and the mind, but by tradition. One of the reasons why man often goes wrong in connection with sex is because he has so little in the way of definite sex-instinct; he is inadequately aware of what he may or may not do; and the sex-urge is stronger even than hunger.

Prof. McDougall proceeds to add on more

instincts—the gregarious instinct, the instinct of acquisition, and the instinct of construction, and he has wise things to say in regard to them all. What, then, does it matter what we call them? Under instinct Prof. McDougall means to include all inherited psycho-physical predispositions to attend to particular objects and to feel and act in regard to them in a particular way, but in many of the examples he gives there is very little particulateness of reaction.

Our plea is that the term "instinctive behaviour" has a definite meaning in regard to animals, and that we should keep to that meaning when we are discussing man. We should think that it made for clearness to say that man had certain primary "urges" or appetites—hunger and love; that he had a number of definite reflexes, such as those illustrated in jerking away from the painful, or in coughing, or in sucking; that he had a number of enregistered capacities, such as those of speech and locomotion; that he had many inborn general tendencies towards certain types of reaction, such as running away from danger, actively resenting interference; but that he had very little capacity for instinctive behaviour in the strict sense of the term.

Perhaps some reason for what may seem pedantry may be found in the latitude with which the noun "instinct" or the adjective "instinctive" is used. We hear of the sex-instinct, when what is meant is an appetite or urge. We hear it said that she knew instinctively that he was a bad man, when the word "intuitively" might serve—if she was right. We hear of the predatory instinct of the profiteer, the diagnostic instinct of the doctor, the sure instinct of the judge at the cattle show, the political instinct of the Turks and then there is M. Bergson's use of the word instinct. It would be humorous if it were not tragic. We speak of using too many words; we often have, and use too few.

There is a practical reason for trying to call things by their right names. When we speak of the parental instinct in insects or birds we are referring to a capacity for a definite course of behaviour, which has stood the test of time, and in 99 cases out of 100 will guide the creature aright.

But the so-called instincts in man are mostly blunt-pointed; they are generalized; they cannot be trusted. One looks with suspicion at the advice "be true to your instincts," unless the word there simply refers, let us say, to such promptings

as those of the altruistic sentiment. And even that cannot be trusted if one takes a long-distance view.

What we have said here has been, we find, more or less anticipated in Dr. Drever's *Instinct in Man*,[1] where Innate Tendencies are divided into "Appetite" Tendencies, e.g. Hunger and Sex, and Instinct Tendencies, the latter including (*a*) *General*, like Play, Experimentation, Imitation, Sympathy, and Suggestibility, and (*b*) *Specific*, like Hunting, Gregarious, Courtship, and Parental.

§ 3. The Rôle of the Unconscious

It does not seem possible to make sense of our mental life unless we utilize the concept of the unconscious. In our normal conscious stream tidings come crowding in from the outer world, they call up memory-traces which influence consciousness, we group the tidings in subtle ways, and we often answer-back or react effectively. Some memory-traces are very accessible and others require a good deal of ringing up. But there are others which cannot be awakened except in unusual conditions, such as dreams illustrate, or by special methods, such as hypnosis, or in crises, such as

[1] Cambridge, 1917, p. 168.

earthquake. They are kept down by repressive barriers. Freud has applied to the region of the mind normally inaccessible to consciousness the technical term *the unconscious.*

In the lower regions of the mind, perhaps in the deeper parts of the brain, there are memory-traces of old, old reactions, which once were perhaps instinctive, which are now more or less obsolete. They remain as parts of the inheritance, but they do not very readily rise to the focus of consciousness. This is the more intelligible in the case of those general tendencies which approach the instinctive, for in instinctive behaviour there is no conscious control at the centre of the concatenation.

The rôle of the unconscious is a vast subject which has been greatly developed in recent years, and it is certain that we cannot envisage our inner life as a whole without taking account of the unconscious. To say a little about it is in a way absurd; it is like saying we must now turn our attention for a few minutes to heredity. But it would be worse to ignore it, and our book is simply a look all round.

Our inner life is like a stream, moving quickly on the surface, moving very slowly along its bed

below. It is sometimes rushing at the surface, surging like a river in flood; or again it is rippling gently, singing as it goes. But it is always hurrying on. Perceptions jostle one another and combine in imaginings; they link themselves in concepts and purposes; and there is often a struggle among the concepts. The unity of our mind establishes control and harmony. Recent memories are also stirred and join in the stream, or send contributions which join in the stream. Below this is the under-current of appetites and urges—sometimes breaking violently to the surface. And here, also, are habitual desires often brought to the focus of consciousness.

Deep down on the floor of the stream is the primary unconscious. It consists of inborn general tendencies, the framework of our inner life, the fundamental conative elements such as the will to live. It also normally includes, we think, the sex-urge during early years, but in adolescence this rises to be part of the under-current nearer the surface, raised, as we have noted, by the activity of hormone-producing glands. The primary unconscious also includes very deep racial memories, some of them, perhaps, pre-human, as is illustrated by the almost universal shrinking from the snake.

The primary unconscious also includes the influences of nurture (environmental and habitudinal) that soaked in without our knowing of them, especially in youth. "As is the world on the banks," Arnold wrote, "so is the mind of man." Or, as Whitman said, "There was a child who went forth every day, and what that child saw became part of him for a day, or for a year, or for stretching cycles of years." Such is the general nature of the primary unconscious, which ought to remain as the slowly-moving deep current of our being. It may send eddies to the surface stream; it is always doing so, just as the water in a pond rises to the surface as it approaches the freezing-point; but it is not meant to be seen. The controlled vividly conscious life is the crown of evolution and supreme; the under-current is fundamental. We should not pull up our flowering plant to see how the roots are looking. That is for the botanist.

Nearer the surface, yet below the under-current of appetencies and desires, there is the secondary or Freudian unconscious, consisting of memory-traces and the like which once were in the light of consciousness (or fore-consciousness), but have been sunk down or repressed, because painful to,

or out of harmony with, the normal mind. They are repressed by barriers, which are relaxed a little during sleep—and then the prisoners steal out like ghosts. Or the barriers may be relaxed in abnormal states, or by special psycho-analytic methods.

The big result seems to be just this, that our mental life is subject to influences which well up from below the level of the ordinary conscious stream. We must try to understand them a little better, and we must beware of disguising an impulse from a hidden and ancient spring in a quite illusory garb of rationality. "*Prejudice*," we indignantly say, "prejudice against the negro, prejudice against clever women, prejudice against social reformers and 'the third floor back,' prejudice against the labour party, prejudice against prohibitionists—No, my dear sir, there is not a bit of prejudice in us; it is our reasoned conviction and by that we stand." If this be our mood, we should study the unconscious; we may possibly get the surprise of our life.

On the other hand, though writing under correction, we venture to suggest three points: (1) Many of the influences from the primary unconscious are wholesome, promptings to be grateful

for. People are apt, in emphasizing morbid traits, to forget the big fact of inherited health. (2) The crown of gifts that has come to man is the more or less developed power of gathering his activities together and unifying them in a conscious self that can look at itself in a mirror and see itself objectively. This vivid, controlling, attention-shifting self-consciousness—the psychical side of cerebral integration—is the human tribunal before which the promptings of the primary unconscious and the repressed unconscious must come for judgment. (3) If a man or woman gets into a serious worry, it is doubtless well to face it, and see what it means, and to get expert advice if it does not smooth out. But in ordinary life, it is probably better to leave the roots of the unconscious to look after themselves; it is better to try to grow some flowers and fruit—including, of course, health of body and mind.

§ 4. Evolution of Morals

Everyone who knows the higher animals will admit their virtues. The male hornbill works himself to a skeleton to provide food for his mate and offspring. The mother stoat will face the

gamekeeper and his dog in defence of her young ones. They abound in kindness, gentleness, patience, and self-subordination. They spend themselves for ends that are not self-preservative, but adapted to secure the welfare of the family. There is not the slightest reason for supposing that the virtues began *de novo* with Man.

On the other hand, there is no reason to believe that animals are ever what one would call moral agents. There is no warrant for supposing that they have moral judgments. That is one of man's prerogatives, and we wish to inquire into its evolution. A moral judgment implies that an action is envisaged in the light of distinctive emotions of approval or disapproval. It is probable that the first moral judgments were social, not individual. A certain action disturbed the community and evoked a public expression of disapproval, which was echoed in the individual and gradually became an individual criterion. Another action thrilled the community with admiration and evoked a public expression of approval, which gradually became an individual touchstone.

This was, indeed, only the beginning, for there grew up *accessory sanctions* to the moral concepts and judgments which were originally based on

emotions engendered in society. It was recognized that good conduct made, on the whole and in the long run, for stability and harmony of life; that bad conduct made, on the whole and in the long run, for discord and disintegration. There grew up rational corroborations of moral judgments till gradually, as Adam Smith said, the moral faculties became the "vice-gerents of God within us."

But what was the origin of the moral emotions on which the moral judgments are based? The general answer must be that they are specializations of non-moral emotions. Very widespread in the animal kingdom is the emotion of angry resentment; and it becomes very strong and also very pointed in the higher mammals. It is often a life-saving emotion; it is the bark that is worse than the bite; it makes the creature look more formidable than it is. Angry resentment has survival-value.

But we can go further than this. We know that righteous anger provokes an increased flow of adrenalin from the suprarenal capsules. This potent hormone increases the pressure of the blood and its sugar content and its coagulability; it secures more rapid breathing movements; it im-

proves the tone of the muscles, it prepares the whole body for a fight, and faking anger will not work.

Now, angry resentment or indignation was in rudiment part of man's inheritance from pre-human ancestry; it was lifted in man to a higher key: for instance, because man did not allow it to be excited by inanimate objects, as animals often do. It became the root of moral disapproval, the expressions of which vary through a wide gamut from aggressive anger to forgiving sorrow.

Then, on the other side, there are among animals kindly emotions towards those that please them or do them good. There are animal friendships and expressions of what we should call gratitude. These are naturally to be looked for among gregarious creatures, and probably the gratitude contains in many cases a lively expectation of favours yet to come. A certain responsiveness pays; even men and women get tired of being kind to those who take it all for granted. Now we can understand a certain enthusiasm in a primitive community over the conduct of some member who saved them from disaster; and in such simple thrills of gratitude and admiration we look for the root of moral approval.

We are adopting, being convinced by it, the conclusion of Westermarck that "moral concepts are essentially generalizations of tendencies in certain phenomena to call forth moral emotions" of approval or disapproval; but we must emphasize his corollary that moral approval is more than grateful pleasedness and moral disapproval more than angry resentment. There came about a gradual specialization. Thus, he says, the moral judgment must have a note of disinterestedness, of impartiality, and of generality, and it must apply to our own conduct as well as to our neighbour's. Obviously our moral judgments are often influenced by personal hurt, by personal prejudice, and by personal opinion, and so it was long ago. But our moral judgments increase in value in proportion as they gain in detachment from the personal. This detachment is a social product, an outcome of social sympathy in the widest sense, of being loyal to the community, not always dwelling on one's little self. The school in which this lesson was learned was Custom; and the lessons crystallized into folk-ways or mores, conventions and traditions, laws and an ethical code.

It is in this way that we would fill in this particular niche in our study of the nature of man scientifi-

cally considered. We may have accepted an erroneous conclusion; it is one that is consistent with the particular point of view from which we are regarding man. There are other points of view. But we see no reason why the moral faculties should be less "the vice-gerents of God within us" because they have had a history, because they express lessons learned in the school of society from social expressions of moral approval and disapproval. The moral concepts of right and wrong, virtue and vice, justice and injustice, which are the predicates of moral judgments, are built up, according to Westermarck's argument, on moral emotions of approval and disapproval. The qualities of disinterestedness and impartiality, and the flavour of generality are the flowers of social sympathy and altruistic sentiment.

We must not, however, forget that the conduct of a man who deliberately departs from the light that is in him is on a different ethical plane from that of those who do dreadful things sanctioned by tribal tradition. Objectively these customs are often terrible—killing parents, exposing children, offering human sacrifice, and many more; but subjectively they may be ethical. It is known, for instance, that the socially-enforced exposure of

a child who is sick unto death may be accompanied by sincere mourning. But our picture of man must not exclude these lurid lights.

Looking back on the misty past and out on the life of uncivilized communities to-day, we have to inquire into conditions that may account for repulsive customs which may have prevailed for a time or prevail still. A life too near the margin of subsistence may account for inhumanity; an inability to do anything with certain diseases except prevent them spreading, and an entire ignorance of what disease is, may account for exposure; a scarcity of women may account for polyandry; and so on. To know all is to pardon all in many cases, and, while the repulsion remains, our moral judgment may become more tolerant. At the same time, it is useful to notice that the simple moral codes of primitive and uncivilized peoples agree more than they differ with what we call enlightened morality. Moreover, we should be frank enough to recognize that if there are features in their conduct that puzzle us, there are features in our conduct that puzzle them. Some of them, indeed, have given expression to the wish that we lived more nearly as we pray!

As to the advance from the primitive morality

to the enlightened, we must recognize the broadening and deepening of the altruistic social sentiment. It has transcended the nation. It has sometimes, it is true, become sentimental, by which we mean that it has sometimes been aroused without sufficient criticism or inquiry. We must also recognize the influence of increased knowledge on the moral emotions. We take extenuating circumstances into account and we recognize the importance of hereditary bias. Another change, perhaps, is that man increasingly judges the delinquency, not the delinquent; not that he approves of the delinquent, but his actual judgment refers primarily to his conduct. And, as Westermarck says, not only has change of cognition produced change of emotion, but there is an increasing desire to find reasons, better than engrained likings and aversions, for our moral judgments. They become more reflective. That they are influenced by our religion and by our philosophy of life is familiar to us all.

Finally, should we not recognize that moral concepts and moral emotions must go on evolving? What happened long ago happens still; the moral judgments of society, often passionate and prejudiced, often for a while mistaken, are bound, even

in spite of ourselves, to find their echo in the individual. For that seems to be a sociological law.

In thinking of the ethical import of society, we should try to avoid two extremes. We must not make too little of the individual, for his conduct does not become truly ethical till he, as a rational and critical person, definitely accepts a social moral suggestion as *his*. We cannot take *our* "good" ready-made or second-hand. The confirmation of a deep innate tendency to help a fellow-creature who excites our pity may be corroborated by a social suggestion, and the result may be a kindly deed. But it may not be much more than an easy-going way of wiping out an uncomfortable impression. It may even be wrong. In any case it is not necessarily an ethical act.

On the other hand, we must not make too little of the society, for there is often in society a registration of what mankind at its best has deemed best—a registration in literature, art, institutions, and tradition. Many are grateful because of this external registering of ideals, for thus society comes to play a useful part as *an external conscience*.

CHAPTER VI

VARIABILITY AND INERTIA

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§ 1. Man's Inheritance

One of the largest facts of life is the persistence of specific organization from one generation to another: like tends to beget like. This depends on what is known as the continuity of the germ-plasm, the germinal vehicle of the specific organization. While most of the cells that arise from the cleavage of the fertilized egg-cell are being differentiated to form the nerves, muscles, glands, skeleton, blood, and so on of the embryonic body, a residue of the germinal material is kept intact and unspecialized, not sharing in body-making. This segregated germ-plasm forms the reproductive organs of the offspring, whence may be launched in due time another vessel on the adventurous voyage of life. This is the deep reason for what may be called organic inertia, the keeping up of a general hereditary resemblance from

generation to generation; yet this is not inconsistent with the occurrence of a certain amount of divergence, novelty, or variability. The two facts should be taken together. There are reasons why the child is usually something new. It has, for instance, two parents, often very different from one another. But there are other reasons, germinal continuity and similar conditions of life, why the child should be a chip of the old block.

In human affairs we distinguish between the heir and his inheritance, but in biological heredity there is initial identity between the heir and the inheritance. Of course, there may be a legacy of food-material or yolk, but that is relatively extrinsic and unimportant. Moreover, from the very start the potential organism begins to trade with its environment, so that every character that develops is a product of hereditary "nature" and external "nurture." Unless we believe in the introduction of a spirit from without at some arbitrary moment in development—a view that does violence to the unity of the organism—we must suppose that the whole being is implicit in the germ-cell. It follows that there is in the germ-cell more than meets the eye, namely, the capacity for a subjective or psychical life. It has been

shown, as a matter of fact, that psychical characters are continued like physical characters; their inheritance obeys the same laws, i.e. may be described by the same formulæ.

Man's inheritance may be thought of as on three levels:—

(*a*) There is a basal block of human organization and capacity, in which there is relatively little variability. This includes all the specific characters of *Homo sapiens*, and his mental capacities as well, besides the universal human appetites and innate tendencies, including strands of ancient origin.

(*b*) There is a more superficial stratum of racial characters, affecting the hair, the skin-colour, the eyes, the lips, the skull, and including less measurable characteristics of temperament and intelligence. Here we have to do with the differences between Jew and Gentile, British and Japanese, White Man and Negro, and so forth.

(*c*) More superficial are family peculiarities, which occur in a certain proportion of the offspring for several generations. They include trivialities in the character of the hair, the skin, the eyes, the nose, but also more important intellectual and temperamental characteristics, such

as mathematical or musical talent, or a roving disposition. They also include morbid features, such as predispositions to certain diseases, and abnormalities, such as colour-blindness.

§ 2. Modes of Inheritance

As it is rare for a human being not to be human, it is probable that there is an integrate of human characteristics, which are continued *en bloc*, the items being closely linked together and very stable. It is possible that the germinal representatives of the specific characters of *Homo sapiens* are now resident in the general cell-substance of the egg-cell, and not in the nuclear bodies or chromosomes, which are certainly the vehicles of the germinal representatives or "factors" of the less fundamental characters. In any case, the fact is that the persistence of the specific human characteristics is very thoroughgoing. The changes are, in most cases, very minute.

When we turn to racial characteristics we find less stability. All negroes are not equally negroid, all Mongolians are not equally mongoloid. It is not unlikely that some of the racial differences are much shallower than they seem at first sight, for

Sir Arthur Keith has pointed out that some of them may be correlated with heritable variations in the activities of the glands of internal secretion. This would apply to mental and moral peculiarities as well as to those that are bodily, like dark skin and crinkly hair. In any case, there is less stability in racial than in specific characters, and every one knows that there are within uncertain limits compatible minglings of the characters of different races. Many of the distant minglings are far from happy.

Mendelian Inheritance.—In the study of family or individual peculiarities, we come across the best examples of Mendelian inheritance in man. There is no doubt that an inheritance is in part built up of more or less clear-cut, crisply defined, non-blending characters, which are continued in some of the descendants as discrete wholes, neither merging nor dividing. We refer to such peculiarities as the Hapsburg lip, having fingers all thumbs, having an extra digit, colour-blindness, deaf-mutism, intelligent dwarfness. These well-defined peculiarities are doubtless represented in the germ-cell by organizational peculiarities of some sort, which have received various names—"determinates," "factors," and "genes." It looks as if

these could be shuffled about and distributed to the offspring in some degree independently of one another, though sometimes hanging together in groups, and could be re-united in fresh combinations.

A good example of a unit-character in man is night-blindness, a peculiarity of the retina that makes it difficult to see in dim light. This night-blindness is known to have occurred in the time of Charles First in one Jean Nougaret, and it has since recurred in a proportion of his descendants for more than three centuries. If a normal member of the lineage married a normal type, none of the offspring were night-blind. But if a night-blind member of the lineage married a normal type, the night-blindness cropped up in a certain proportion of the descendants.

Mendelian characters in man include, besides those mentioned, the colour of the iris, pre-senile cataract, and certain kinds of feeble-mindedness and epilepsy, and, in all likelihood, a great many more, and normal just as much as abnormal.

This is plainly of very great importance, but our knowledge of the facts is still very young. A man with a Mendelian peculiarity, say on the minus side, marries a normal type, and it is likely

enough that the child is normal. This is expressed by saying that the Mendelian character in question is recessive to normality. If a waltzing mouse is crossed with a normal mouse, the offspring are all normal. But the recessive character, though unexpressed in the body of the offspring, is continued latent in the germ-cells; and if the offspring in due time should marry a type with a similar history, then the recessive character is likely to find expression in some of the offspring. For a family of four the probabilities are—one quite normal, one quite peculiar, and two apparently normal, who, nevertheless, have the recessive character latent in their germ-cells, and likely to find expression in subsequent generations. The practical importance of the situation is that the Mendelian factor is either there or not there; it does not blend, and it cannot disappear as long as the lineage continues by the multiplication of all its representatives. This is a modern commentary on the words "unto the third and fourth generation."

Suppose a deteriorative Mendelian character to arise as a variation in a stock, it may find expression in the offspring, although the other parent shows no trace of the peculiarity. It is then said

to be *dominant*. If two of the offspring with the peculiarity marry and have a family, the probability is that only one grandchild out of four will be normal. More than that, of the three abnormals one will be so purely abnormal, that if it mate with another of similar history, all the offspring will be abnormal. Thus we see how an abnormal character, say a deteriorative character, may not only spread, but may oust its correlated normal character from the majority of the descendants.

Suppose the abnormal Mendelian character, such as tendency to pre-senile cataract, does not find expression in the offspring of the abnormal parent and a normal parent, then it is said to be *recessive*. It seems to have gone, but it has not really gone; it is latent. For if the offspring in due time mate with another of similar history, then the probability is that one-fourth of the offspring will show pre-senile cataract. And should these individuals, who are what is technically called "pure" as regards the abnormality, mate with others of similar history, all their offspring will be abnormal.

Is there no way of stopping this dread persistence? The only way is that the bearers of the deadly deteriorative character should cease to multiply. The same result will ensue if the ex-

pression of the deadly deteriorative character should be fatal before maturity is reached, and, happily, in some cases there is a shunting forward of the deterioration to earlier years of life. Thus the child may die in infancy, or even before birth. This is what Sir F. W. Mott calls the law of anticipation.

What if the deteriorative recessive should marry into sound stock? The likelihood is that all the offspring would be apparently normal, the deteriorative feature being, in this case, recessive to normality. But this immediately happy result is shadowed by the introduction of the deteriorative factor into a sound stock, so that tares are afterwards likely to spring up along with the wheat. Yet if the offspring never married with others of similar history, or with others bearing the recessive character, then the deteriorative recessive character would not find expression. It would be at most latent, never patent.

This explains, as we shall see, why in-breeding is often followed by untoward results. It brings together the bearers of latent recessives, and in some of their offspring the recessive character *must* find expression.

It has been usual to distinguish from Mendelian

inheritance what is called Blending inheritance. When a rabbit with long lop ears is crossed with a rabbit with short lop ears, the offspring have lop ears intermediate in length between those of the parents. Similarly, a mulatto is describable as a blend between the negro mother and the white father; and the stature of the offspring often appears to be intermediate between the statures of the two parents.

In many cases, however, what is *describable* as blending is a complex case of Mendelian inheritance. Suppose there are four factors for the hair, and that they are different in the two parents. On the father's side, let us suppose, they are AbCd, the capitals being dominant to their analogues. On the mother's side, let us suppose the factors are aBcD, the capitals being dominant. The offspring would have hair represented by the formula ABCD, which might have the appearance of a blend of the hair of the two parents. The reappearance of a recessive feature in the next generation would indicate this, and very white quadroons are well known.

Filial Regression.—Of great importance for man is the idea of Filial Regression, formulated by Sir Francis Galton, Darwin's illustrious cousin.

It was based on a study of the inheritance of human stature and some other qualities, which led him to recognize a marked tendency to mediocrity or towards the average of the stock. It has been remarked that the offspring of extraordinarily gifted parents are often rather commonplace and that the children of under-average parents sometimes turn out surprisingly well, both physically and mentally. It looks as if there were some mysterious succession-tax levied on marked deviations from the average. The succession-tax is levied on great defect as well as on great excellence, for filial regression works upwards as well as downwards, forwards as well as backwards. Filial regression has nothing to do with reversion or deterioration.

Filial regression depends on the fact that our inheritance is multiple, say one-fourth from each parent, one-eighth from each grandparent, one-sixteenth from each great-grandparent, and so on backwards till we come to an average sample of the stock. It does not apply to sharply defined unit characters which do not blend, and it will not apply to lineages where there is very strict marriage selection, e.g. within a small caste.

Take a few sentences from Galton.

"The more bountifully a parent is gifted by nature, the more rare will be his good fortune if he begets a son who is as richly endowed as himself, and still more so if he has a son who is endowed yet more largely. But the law is even-handed; it levies an equal succession-tax on the transmission of badness as of goodness. If it discourages the extravagant hopes of a gifted parent that his children will inherit all his powers, it no less discountenances extravagant fears that they will inherit all his weakness and disease."

It might be thought that this is depreciating the value of a good stock. But the children of a gifted pair are likely to be more gifted than those of a mediocre pair; only there is likely to be a proportionately larger regression. If there are two very gifted members of a poor stock who are personally equivalent, so to speak, to two ordinary members of a good stock, the children of the former will tend to regress; those of the latter will not. The moral is that care of good stocks is more important racially than care of very exceptional members of poor stocks. By stock is meant a group within a race of somewhat similar individuals among whom inter-marriage is common.

Prof. Karl Pearson points out that if we take fathers of stature 72 inches, the mean height of

their sons is 70.8 inches; we have a regression towards the mean of the general population. On the other hand, fathers with a height of 66 inches give a group of sons of mean height 68.3 inches; they have progressed towards the mean of the general population of sons.

"The father with a great excess of the character contributes sons with an excess, but a less excess of it; the father with a great defect of the character contributes sons with a defect, but less defect of it. The general result is a sensible stability of type and variation from generation to generation."

This is a very important idea—the tendency that offspring have towards the mean of the population. Prof. Karl Pearson points out again that

"A man is not only the product of his father and mother, but of all his past ancestry. Unless very careful selection has taken place, the mean of that ancestry is probably not far from that of the general population. In the tenth generation a man has (theoretically) 1024 tenth great-grandparents. He is eventually the product of a population of this size, and their mean can hardly differ from that of the general population. It is the heavy weight of this mediocre ancestry that causes the son of an exceptional father to regress towards the general

population mean; it is the balance of this sturdy commonplaceness which enables the son of a degenerate father to escape the whole burden of the parental ill."

Now, the largest aspect of this is that society, in regard to certain characters, tends to move like a great fraternity. There is *social* inertia. There is a tendency towards an average. The minus side is the risk of sinking into mediocrity. The plus side is the tendency to counteract inferiority or slipping back.

Reversion.—One of the untidy bundles in biology is labelled "Reversion," which may be used as a general descriptive term for "harking back." But it seems to include a variety of phenomena, and it is a bit of a bogey. (1) Through defective nurture a child is sometimes not well finished. There is an arrest of development, as in cleft palate and hare-lip. (2) Some perturbation of the regulative system may bring about a premature stoppage, as in cretinoid children. (3) Skipping a generation is normal in Mendelian inheritance. Suppose two parents differ in a particular feature of the non-blending sort; the offspring will be like one of the parents. If in the next generation individuals of similar history pair, some of the

offspring will be like the grandfather, some like the grandmother, some like the parents. The recessive character skips a generation. (4) A recessive character which has been hidden by the corresponding dominant for generations may suddenly reappear when both parents have it. This also might be called a reversion. (5) True reversions are rehabilitations of long latent ancestral characters, the reactivating of the vestigial, but they seem to be very uncommon.

To students of heredity it is well known that a particular trait may have extraordinary staying power. It may be of little importance—say colour-blindness; or it may be a serious handicap—say a predisposition to a certain kind of epilepsy. On the plus side it may be a peculiarity of the hair or musical talent. These unit characters persist for generations and centuries. Yet it is certain that the germ-cells are viable unities, not portmanteaus of hereditary luggage. The fertilized egg-cell, in which each new life begins, is a viable unity, an implicit organism. It may include disharmonious elements, as there may be rotten threads in a web, but on the whole it is a viable unity. Ancient strands, strong and tender, are in it; ancient strands, lustful and gluttonous, are

in it; but for hundreds of thousands of years these have all been combined in a viable human compromise. There is a vivid poetic touch in Walt Whitman's picture of man being "stuccoed all over with quadrupeds"; or in Tennyson's picture of starving the ape and tiger within us; but once man began, he was always man, plus relic strands. To the crematorium of nightmares—such as "man the gorilla's cousin," "the brutal primitive man," the "aboriginal free-lover," let us consign man as a menagerie.

There are in the personality strands that go back into antiquity, but they have been long since partially humanized. The strands are ancient, as Professor Jennings puts it, but each knot is new. It is tied afresh at the beginning of each new life, and this implies some measure of uniqueness and freedom in the self. Moreover, the tying of the knot thousands of times generation after generation has affected the threads. They are human.

So let us say with Sir Thomas Browne:

"Bless not thyself that thou wert born in Athens; but among thy multiplied acknowledgements, lift up one hand to heaven that thou wert born of honest parents, that modesty, humility, and

veracity lay in the same egg, and came into the world with thee."

§ 3. New Departures: Variations and Mutations

The heredity relation is such that like tends to beget like, but it is not inconsistent with this that it should allow of the emergence of novelties. These novelties or idiosyncrasies are summed up in the word variations, which includes minor *fluctuations*—a little more of this and a little less of that—and *mutations* which are more definitely new, appearing with some measure of abruptness, well finished off from the first. In fluctuations, such as slightly darker skin or hair, the organism creeps. In mutations, such as genius, it leaps. Fluctuations in man include slight changes in colour, in proportions, in muscularity, in alertness, in thickness of skin, in activity of ductless glands, and so on. Mutations in man include healthy gigantism, well-proportioned dwarfness, artistic skill, mathematical vision, genius of any kind, a roving disposition, having fingers all thumbs, calculating capacity, colour-blindness, and so on. It is probable that what one would call originality

rather than genius is nearer to a mutation than to a fluctuation; it is a new pattern, perhaps a re-arrangement of a number of Mendelian characters.

It is to be feared that we pay insufficient respect to variations, not realizing that they include the most precious things in the world, namely, new departures in a progressive direction. That they include relapses and aberrations is plain, but there are novelties on the plus side as well—new tendrils growing out into the future and seeking for some support. Yet the parents say of their boy, "It is a pity he is not more like other children," and the teachers say, "A disappointing boy; good abilities, you know, but peculiar, yes, distinctly peculiar." By and by he is called a crank. We are past masters in the art of frost-biting buds.

As to the origin of new departures we know little. In regard to the minor ones, we can say that they may be due to permutations and combinations of the hereditary items in the course of the history of the germ-cells, especially at the time of their maturation, when an item is often lost. Or it may be that there is a shuffling of the hereditary cards at the beginning of the individual life, i.e. in the fertilization of the egg-cell. Deeply penetrating influences of environment or of food

may provoke changes in the complex architecture of the germ-plasm. Such conditions would be more likely to provoke rearrangements of items, new patterns, than distinct novelties. The question is so dark that perhaps the less said the better. The germ-cell is a complex potential organism; it has a capacity, which may be primary, of reorganizing itself, of making experiments in self-expression. We should remember again that the fertilized egg-cell is not like a bag of items—the legacy from parents and ancestors. It makes itself a unity, a viable harmony, a new creature. Perhaps the problem of the origin of the distinctively new will always elude us, because it is insoluble apart from the psychical side, and this is suggested in our phrase, "making experiments in self-expression." Perhaps a mutation is like a new idea.

But can one not say anything practical? Is there no recipe for progressive variations? The answer must be very cautious, but there are three things to be said. First, a study of biographies points to the conclusion that men of outstanding ability have oftenest arisen not from in-breeding within castes, but from out-breeding in the general population. Exogamy among dissimilars, not

racially far apart or incompatible, makes for variability. It will be noted, however, that an exceptional member of a mediocre stock is not likely to have offspring as brilliant as himself.

Second, there are facts in regard to animals which suggest that considerable changes in nurture (all manner of environmental, nutritional, and functional influences) may act as liberating stimuli on the germ-plasm, so that the offspring show some new departure. Changes are lightsome, and it may be that improvements in nurture will provoke improvements in nature—not in the direct way that was once believed in, but indirectly by prompting variations.

Third, the most obviously practicable thing we can do is to give a promising novelty a good chance. We have no recipe for genius, but we need not let genius starve, or remain in enforced celibacy. The new tendril probing into the future, let it find support.

§ 4. The "Nature and Nurture" Problem

Various writers, such as Shakespeare and John Knox, have made a distinction between the hereditary "nature" and the environing "nur-

ture." Sir Francis Galton made the contrast precise. By "nature" is meant all that is involved in the natural inheritance, the vehicle of which is the germ-plasm. By "nurture" is meant all manner of surrounding influences—climate, soil, scenery, house, food, work, play, education, and the social milieu. This is a useful distinction between the natural inheritance and the influences that play upon it; the misfortune is that an *antithesis* has been made between the two. For they are the two necessary components of a resultant. The product of nature and nurture is the organism with its many characters and the man with his character. The wind as well as the snow is needed to make the drift. The furnace as well as the clay is needed to make the brick.

It cannot be said, however, that the useful distinction is always plain sailing. For it is difficult sometimes to say when particular factors in nurture come to have an appreciable influence. In the case of the human infant it is plain that there is a great deal of nurture before birth.

For the individual the influences of nurture mean much for two reasons. First, because the full development of a heritable character depends on its receiving appropriate nurture. The Proteus

in the Dalmatian caves has the hereditary capacity for developing pigment, but it cannot do so without the stimulus of light. In an illumined aquarium it soon becomes dark. So it is with some human "dwellers in darkness," their nurture is sometimes more defective than their nature. On the other hand, when the Proteus is reared in the light its arrested eye does not become a normal eye, though it makes some advance in size and differentiation. The Ethiopian cannot change his skin.

Secondly, nurture means much to the individual because peculiarities in nurture produce corresponding modifications—for good or ill—on the body. The man bears the marks of his trade, of his habits, of his exercise, of his country, of the weather. There are progressive and deteriorative modifications, and the imprinting of them is largely under man's control. Even when we cannot change the nurture, we can sometimes circumvent it. We cannot change the weather, but we can put on a waterproof. There is no one who knows to what extent man could improve himself by making more of his available nurture. Sandow's diagrammatic advertisements are *parables*.

The importance of nurture for the individual is conceded, but what of its importance for the race?

Here we come up against the question of the transmissibility of individually acquired modifications, the direct results of peculiarities in nurture. If these are not transmissible, then modifications have no direct racial importance, and it is in this direction that the bulk of the scientific evidence points. There are only a few cases that suggest the other answer, so that we cannot count on this. Without forecasting the question, we must act as if individually acquired modifications were *not* transmissible as such or in any representative degree.

What then? (1) It is some consolation to notice that if useful modifications cannot be handed on, the same will be true of deteriorative modifications. (2) If beneficial modifications cannot be entailed, they can be reimpressed on each successive generation. (3) Although the direct effects of peculiar nurture, say careful exercise or systematic poisoning, be not handed on as such or in any representative degree, their indirect effects may influence the offspring for good or ill, especially in the case of mammalian mothers. (4) It may be of importance to hammer on a useful modification generation after generation, for it may save or improve the life until, happily, there is an

emergence of a germinal, and therefore heritable, variation in the same useful direction. (5) It must be admitted, however, that there is distinct danger in masking rotten material with modificational veneer.

In less critical days there was among social reformers considerable enthusiasm over the results of improving environment and function. They did not sufficiently allow for the inertia of the hereditary nature. They did not realize that the individual gains may not directly enrich the race.

Both these points have been more than realized, and the pendulum has swung in the opposite direction. To some extent this is regrettable, because improvements in environment and function must always be to the good.

What is one to say about this? If useful modifications are not transmissible, we must attach more importance to them, not less, for we have to secure that they are reimpressed on each generation. Moreover, everything that makes for increased healthfulness is for the good of the race. If it does not operate in the direct way previously supposed, it operates indirectly. It is also certain that ameliorations of nurture provide a milieu—

a climate, as it were—in which progressive variations have a good chance.

From statistical investigations Prof. Karl Pearson has concluded that "the degree of dependence of the child on the characters of its parentage is ten times as intense as its degree of dependence on the character of its home or uprearing." "It is five to ten times as profitable for a child to be born of parents of sound physique and of brisk orderly mentality as for a child to be born and nurtured in a good physical environment." Miss Elderton concludes: "The influence of environment is not one-fifth that of heredity, and quite possibly not one-tenth of it." These are important conclusions, but they need not lead us to depreciate nurture. We must remember (1) that nurture begins its influences nine months before the child is born, and we do not really know how much this ante-natal nurture counts for; (2) that if nurture counts for much less than nature, it has this advantage, that it gives us a readily available leverage; (3) it is a pity to make too much of an antithesis between what are obviously complementary factors. Is it the water or the wind that counts for most in making the waves along the shore? If two components are essential to a re-

sultant, does it matter very much which we call the more important? We do not expect nurture to work miracles—there are callous types like Caliban of whom Prospero said, "A devil, a born devil, on whose nature, nurture will never stick." We do not expect miracles, but we know of wonders!

§ 5. The Other Side of Heredity

The study of heredity leaves one with an impression of inexorableness and fatalism. This is an old-time impression in a way, expressed in such sayings as, "He that will to Cupar, maun to Cupar"; but it has been deepened by the understanding of heredity, which is quite modern. Yet the impression is not adequate.

It is true that our inheritance includes some ancient legacies that may be disturbing. It is true that it often includes morbid taints and pathological predispositions. It is true that many characters have extraordinary momentum. It is true that the foundations of our whole nature are laid when the individual life begins. It is true that we cannot add to the number of buds, as it were, that we inherit. This is the one aspect, sometimes very discouraging.

But what is the other side?

(1) There is entailment, but it is even-handed. We have a rich inheritance to be grateful for. We need not be ashamed of our poor relations among mammals, for they laid the foundations of parental kindness, of self-subordination, of kin-sympathy, of courage, resoluteness, and nimble wits.

(2) There are perturbing and disharmonious elements in our inheritance, but it should be recognized that the trend of evolution is against them. The stable, the harmonious, the integrative have, both in the individual and the race, more staying power than the disruptive, the incongruous, the disintegrative.

(3) Heredity implies inertia, but variability implies creativeness.

(4) The influences of ameliorated nurture may not admit of entailment, yet they may serve as variational stimuli, prompting the emergence of the new.

(5) We may not be able to add to the number of our hereditary talents. A few of us are one-talent men, a few are ten-talent men, most are five-talent men; we cannot change the number. But we can trade with our talents—though that is easier with ten talents than with only one.

(6) The five-talent man cannot, it seems, endow his son with the gains he made by trading, but only with the original five talents. There may be alternatives, of course, from the mother. And yet the father's gains may count. It is safer to drop the metaphor: we mean that improvements in health, for instance, are sure to repercuss on the general vigour of the stock.

(7) Finally, the utmost importance attaches to the social environment or the social heritage, which has been progressively enriched through the ages and admits of endless enrichment. It includes literature, art, institutions, traditions, customs, laws. It enregisters the things of the spirit, as well as material wealth. It is an atmosphere, a climate, a soil in which hereditary nature can develop generously. It is a safeguard that helps to keep man from slipping down the slope of his ascent. It is an evolving sieve that winnows the wheat. It points forward as well as backward, for it is expressive of man's best purposes.

CHAPTER VII

SIFTING AND WINNOWING

§ 1. The Need for Sifting.
§ 2. The Sifting of Mankind.
§ 3. Selection by Disease.
§ 4. Conflict of Tribes and Races.
§ 5. The Dilemma of Civilization.
§ 6. Sex Selection in Man.
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CHAPTER VII

SIFTING AND WINNOWING

§ 1. The Need for Sifting

One of the lasting lessons of Darwinism is the importance of Nature's sifting, in other words, Natural Selection. The regime of Nature is testing the new and holding fast to the relatively fittest. As Meredith says—

> Behold the life of ease, it drifts,
> The chastened life commands its course,
> She winnows, winnows roughly, sifts,
> To dip her chosen in her source.
> Contention is the vital force
> Whence pluck they brains,
> Her prize of gifts.

The sifting takes manifold forms, quick and slow, drastic and gentle; and the sieves are many—the weather, the climate, the food-supply, and all the animate environment of fellows and foes. There is

also great variety in the qualities that are preserved by the sifting—now strength and again wits, here armour and there weapons, in one case a long life and in another case a large and successful family, at one time sturdy self-assertiveness, and at another time self-subordination in the service of offspring or kin. But, so far as we know, every gain, whether reached by many a minute addition of one to one, or grasped by a sudden venture, has to stand the criticism of selection in some form or other.

In his striking and brave book, *Man and the Attainment of Immortality*,[1] Prof. James Young Simpson has laid emphasis on the change in the criteria of selection from age to age among living creatures, both as regards organic evolution as a whole and the history of particular classes of animals. At one time the dominant criterion is success in procuring and utilizing food; at another time it is success with the family and all that this implies. In one age the selection seems mainly in relation to the muscular system—the race is to the swift and the battle is to the strong; in another age the premium is on the brain and its cunning. "The rising into power of one of these factors does

[1] 1922.

not, of course, mean the disappearance of the one that held sway previous to it. It still continues to function, but in a subordinate way. Further, this cycle or rhythm may be traced, not merely in the history of life as a whole, but to a lesser degree in such a group as the vertebrates, or even the mammals."[1] This is a sound and useful idea, that there has been an evolution of sieves as well as of the material to be sifted. Even in mankind one can see that the sieve favouring those with brawny muscles is being replaced by a sieve that favours the alert nervous system. At the same time, as Prof. Simpson, of course, recognizes, there are permanent indispensables, like health, which must *always* be winnowed for.

§ 2. The Sifting of Mankind

In early days, before his foothold was strong, man was mainly in the grip of Natural Selection. There were wild animals disputing his claims, and men who were clumsy, dull, or foolhardy would be eliminated. There were plants to be tested, and men who were incautious when hungry, or forgetful of the fruits which made them ill, would

[1] Simpson, p. 228.

be eliminated. There were shelters to be found or built, storms and floods to be avoided or foreseen, hard times to be provided for, and there must have been a long process of sifting which got rid of many of the shiftless and thriftless. These were the days of Nature's winnowing. There can be no doubt they meant much.

But primitive man grew wiser and his foothold firmer; he profited by ages of experience and experimenting, and he began to throw off the yoke of Natural Selection. We say began to throw off, for there was still the rough winnowing of famine after a bad season, or when the climate changed for the worse, either in the direction of severe cold or lasting aridity. But there came to be stores in the ancient village communities, and there was trekking from aridity to promised lands: even famines could be forestalled. The sieves that remained were, in large measure, without Natural Selection; they were mainly Disease and War.

§ 3. Selection by Disease

An epidemic often carries off a considerable proportion of a population, and in former times epidemics were more frequent, more widespread,

and more drastic than now. But it does not follow that a plague is selective. Mere thinning does not spell progress. What counts is a differential death-rate. When a disease is commoner and more fatal among those with a weak constitution, then there is selection. When a disease attacks more especially those who are careless and thriftless, then there is selection. When a disease is more fatal among those who have lived intemperately, then there is selection.

On the other hand, infection with certain diseases, such as typhoid fever, is often quite casual. It was the man's misfortune, not his fault to be infected. That the plague in India usually breaks out among poor people working in a mill is not because their constitutions are feebler than those of men and women working in the open; it is because the conditions of their work make them liable to be bitten by the rat-flea, which carries the microbe of bubonic plague. Similarly with sleeping sickness and malaria; the introduction of the microscopic animals into man's blood is largely fortuitous.

It has been proved statistically by Prof. Karl Pearson and others that the death-rate in civilized countries at present is still in part selective. The

proportion of the selective death-rate to the non-selective death-rate can be measured. Prof. Pearson refers to Lord Salisbury's remark in regard to Natural Selection, that "no man, so far as we know, has seen it at work." On the contrary, says Pearson, "it is at work, and at work among civilized men, where intra-group struggle, i.e. autogeneric selection, is largely suspended, with an intensity of the most substantial kind."

But the whole tendency of civilization has been to reduce plague and pestilence, and to discover ways of baulking a disease when it gets a grip. Thus the selective death-rate must diminish. So many microbic diseases are indiscriminate that it is wasteful not to try to check them. Even in cases where the disease would, on the whole, eliminate the weaker constitutions, we are compelled, by the growth of social sentiment, to make considerable efforts to save every life. Apart from humane sentiments, it is in the interests of self-preservation to conquer disease and keep it from spreading.

In his interesting book, *Darwinism and Race Progress*,[1] the late Prof. Berry Haycraft argued in support of the extreme conclusion that man

[1] 1895.

has been selected by the action of microbes. Leprosy is (or was) "a depopulator of starved, ill-nourished districts, and the race recruits to its advantage from those more favourably placed." The tubercle bacillus, he says, is one of our "racial friends," for it tends to eliminate those of delicate and feeble constitution.

"It may not be flattering to our national vanity to look upon Englishmen as the product of the selection of the micro-organisms of measles, scarlet fever, small-pox, etc., but the reasonableness of the conclusion seems to be forced upon us when we consider his immunity from these diseases as conpared with that of natives of the interior of Africa, or of the wilds of America, whose races have never been so selected, and who, when attacked for the first time by these diseases, are ravaged almost to extermination."

Prof. Haycraft was dealing with microbes that are discriminate in their attack, and that do not leave the body deteriorated. There are microbes which weed out the weak; if we stamp out the infectious diseases which they cause and if we do nothing else, we tend to perpetuate poor types. But the argument must not be accepted without some proviso. It seems to exaggerate the impor-

tance of bacteria as the sifting agents, which have led to civilized man. There have been other selective agencies besides bacteria. Moreover, we should like to be a little more certain that discriminate bacteria like those of leprosy and phthisis have actually been as beneficial to the race as Prof. Haycraft maintained.

Still, there is some truth in the argument! Let us hear it again.

"It comes out pretty clearly from our short study of the infective diseases that some of the microbes that cause these, such as the bacillus of tubercle, only feed on unhealthy human tissue, while the greater number of them kill, if anything, the weak rather than the strong. They are therefore, on the whole, and as a natural consequence, our race friends rather than our foes, and if we attempt seriously to do away with their selective influence—viz. the elimination of the weak and the preservation of the strong—we must supply this selective influence by one equally potent, or the race will tend to deteriorate. . . . As selection is the race-changer, we must replace the selection of the microbe by the selection of human forethought."

The argument ends rightly. There is selection by disease. The hygienists tend to do away with this sieve, eliminating our eliminators. We cannot

turn back on this path. But it is plain that we must, for safety's sake, put other modes of selection into operation. And, after all, man ought to be able to select better than bacteria.

§ 4. Conflict of Tribes and Races

The struggle for existence is a technical phrase for the manifold clash between organisms and environing difficulties and limitations. These difficulties and limitations in man's case may be environmental; he struggles against the weather, the climate, the storm, and the lack of food. In so doing he may have to compete with his neighbours and near kin—this is intra-societary, or intra-tribal, or intra-communitary competition—lasting, though often in subtle guise, till the present day. The struggle with environmental limitations and difficulties is not primarily competitive; man does not compete with Nature. But in the course of man's struggle with Nature, he may compete with his next-door neighbour, when there is not food enough for both. Out of the struggle with Fate there may emerge competition between Fellows. Or it may be that man answers back best to environmental and nutri-

tional difficulties by combining with his neighbours, and thus mutual aid comes to be one of the modes of reaction in the struggle for existence.

Early man competed with beasts of prey, and it was doubtless good for him, for it meant eliminating the dull and reckless, fostering the brave and resourceful. But soon the creatures who troubled him, who invaded his home and spoiled his goods, were his fellow-creatures, and thus arose inter-tribal or inter-racial conflict, which has continued from the beginning even until now.

In the course of time, but perhaps not for a long time, man turned on his fellows the club, the spear, and the bow that he had first used against wild beasts.

"General Pitt-Rivers has shown how closely man follows in war the devices he learnt from the lower animals; how his weapons imitate their horns, claws, teeth, and stings, even to their venom; how man protects himself with armour imitated from animals' hides and scales; and how his warlike stratagems are copied from those of the birds and beasts, such as setting ambushes and sentinels, attacking in bodies under a leader, and rushing on with war-cries to the fight."[1]

Man learned war from the beasts.

[1] Tylor, *Anthropology*, p. 221.

It is not difficult to understand how primitive wars began. One tribe—driven by hunger, perhaps—invaded another's territory and had to be resisted; a misdeed by a stranger had to be punished; an ambush-disaster had to be avenged. Later on the motives became more complex; there were raids for booty, for women, and for slaves.

It seems idle to seek to deny that simple warfare was often inevitable, and that it would sometimes serve as a factor in progress. In simple warfare there is a selective death-rate; the extremely daring would tend to be eliminated but also the clumsy and the cowardly. On the whole, the fitter tribe would be victorious.

What is even more important is that the war would have an integrative influence. Nothing makes so much for solidarity as a common enterprise, especially if it be for a good cause. Warfare means discipline and self-subordination. Perhaps wars played an important part in binding tribes into a nation. Moreover, the mixture of tribes after a war may have helped to promote variability in the stock. Strongly as we believe that warfare is an anachronism to-day—a last resource—we cannot shut our eyes to the possibilities of progress through war in earlier times.

About the time of the publication of Darwin's *Origin of Species*,[1] Mr. Stuart Glennie advanced a theory of the importance of what he called the "Conflict of Races" as a factor in bringing about civilization. A "higher fair race" conquered a "lower dark race" and settled down in their midst in Chaldea or in Egypt, dominating them, making them work, becoming rich through them, and thus attaining to economic conditions which made intellectual development possible. This sort of conquest happened, not once but several times, giving rise to the great ancient civilizations.

While admitting that primitive warfare was inevitable now and then, and that it made for progress by sifting the valiant in fight and by integrating a tribe, we must avoid the extreme of making too much of this factor. We have been so mis-educated by history books that give prominence to picturesque warfare and say little about the ways of peace, that we are insensitive to the fallaciousness of the Hobbesian hypothesis of permanent primitive bellicosity. The probability is that for a long time man's foothold was not secure enough to allow of much warfare between com-

[1] 1859.

munities or tribes. Men had to stand together against wild beasts, and, as a matter of fact, we know that very early postglacial men lived in crowded village communities. As Kropotkin put it, the cave-dwellings are sometimes superposed in storeys, and recall the nests of sand-martins rather than the dens of carnivores.[1] Similarly, we know of numerous neolithic lake-villages, over forty, for instance, round the Lake of Neuchatel. There were long ages of communities, we believe, before there were clans or tribes, just as there were long ages of tribes before there was a nation. There were families, no doubt, but families within a community, for the times were not ripe for isolated families. For such reasons we cannot agree with Huxley's well-known description of the primitive state of affairs: "Beyond the limited and temporary relations of the family, the Hobbesian war of each against all was the normal state of existence."[2] We think Darwin was nearer the facts when he said:

"The small strength and speed of man, his want of natural weapons, etc., are more than counterbalanced, firstly, by his intellectual facul-

[1] *Mutual Aid,* 1904, p. 80.

[2] *Nineteenth Century,* February, 1888, p. 165.

ties; and, secondly, by his social qualities, which led him to give and receive aid from his fellowmen."[1]

Sir Henry Maine spoke of "the universal belligerency of primitive man," but this is a very dubious conclusion. The weapons of primitive man are hunting weapons. Apart from punishments and blood-vengeance, war is not general among uncivilized peoples.

§ 5. The Dilemma of Civilization

In preceding chapters we have emphasized the idea of man's apartness. Over and over again we have sounded the note of his superiority to the mammal. Even when primitive, even when savage, "what a piece of work is a man!"

Yet the contrast is not wholly in man's favour. Among wild animals disease rarely grips, parasites are rarely troublesome, senility is unknown: among men disease is rife, healthfulness has to be striven for, parasites are terribly depressing and often fatal, senility is common. Moreover, most wild animals show generally what civilized man shows somewhat occasionally, a buoyant self-mastery, an abandon of vigour, an absence of

[1] *Descent of Man*, 2nd ed., p. 63.

fatigue, a freedom from worry and "bad habits." Why is man so extraordinarily shackled by disharmony, lack of control, disease, bad habits, unhappiness?

In discussing disharmonies we shall refer to the taxes levied on evolutionary progress and on artificiality of life; but, first of all, we wish to refer to what is often called "the dilemma of civilization."

Without weapons save his wits, without armour save his mutual aid, primitive man was, as Sir Ray Lankester says, "Nature's rebellious child," and in later days of his fine equipment he has continued his insurgence, hurling back against Nature's sentence, "You must die!" the virile defiance: "Nay, but I will live."

This is admirable, but Sir Ray Lankester, in his fine lecture, *The Kingdom of Man*, goes on to point out that man insists, not only on surviving, but in surviving along a line that pleases himself. This means that he has in many ways thrown off the yoke of Natural Selection. As we have seen, he secures survival for individuals whom Nature would soon weed out; he tends to be too fond of being comfortable; he conquers disease and famine. "Consciously or unconsciously," as Prof. Karl Pearson puts it, "we have suspended the racial

purgation maintained in less developed communities by natural selection." And what Dr. Trotter sees so clearly must be kept in mind, that just as the integration and good-will of the society increase, the more will the unit be sheltered from the sifting of Natural Selection.

The point is that man rebels against Nature's sifting, and that the mere fact of there being a society is a shield. Yet man is not substituting for Natural Selection a sufficiently stringent rational and social selection. "This opens the way for deterioration and disintegration." The best statement of this dilemma is that given by Herbert Spencer—

"The law that each creature shall take the benefits and evils of its own nature has been the law under which life has evolved thus far. Any arrangements which, in a considerable degree, prevent superiority from profiting by the rewards of superiority, or shield inferiority from the evils it entails—any arrangements which tend to make it as well to be inferior as to be superior, are arrangements diametrically opposed to the progress of organization and the reaching of a higher life."

It is a serious situation. Social sentiment has grown strong, social solidarity is a powerful influ-

ence, for many it has become habitual to stretch out the helping hand; so we tend to encourage the multiplication of the relatively unfit and are cruel to the future *through* our kindness in the present. Even in the present, coddling the waster may mean handicapping the worthy.

A variety of causes has contributed to a state of affairs extremely serious. Thus a great deal of evil has ensued from that dominance of the power-machine which we associate with the industrial revolution. But our present point is that man has refused to allow old sieves to be used; and yet he is not using new ones that work well. From Natural Selection he has passed to *no* selection, or to artificial uncriticized selection, only rarely to rational or social selection.

It is idle to deny that we shelter inferior types and allow them to multiply. But this interference with natural selection is wrapped up with saving useful lives. We must save lives; the question is whether, by more scrutiny, we may not continue to save lives, without permitting the multiplication of the unfit. In 1916, there were 600 weak-minded living descendants of the five "Juke" sisters. The race cannot stand this sort of thing. One may at least look for a movement of public opinion

very strongly against the multiplication of those whose constitutional deterioration is radical and indubitable. It is worth while visiting an institution for defectives to be impressed with the horror which their multiplication implies. One does not say much next day about infringing the liberty of the subject.

It is idle to talk about ceasing to try to save so many weakly or defective lives. We cannot reverse the development of social sentiment. We must hold out the saving hand. Moreover, we do not know enough to nip unpromising buds. We cannot contemplate scientific infanticide except in a very few cases, which clearly point to the desirability of euthanasia. Moreover, society cannot disown its debts. Yet, can we not reduce possibilities of multiplication for a century or two? Can we not even reduce the likelihood of adding to the precipitate? Out of the 600 living feeble-minded and epileptic Jukes, there were, a few years ago, only three in custodial care.

We must continue to be merciful, but it is admitted that our kindness often tends to multiply the sore we try to cure. It is not the rarity of Christian charity that we have reason to lament, but its frequent short-sightedness. Therefore one

welcomes, as in the promiseful direction, everything like charity organization schemes to replace so-called indiscriminate charity, for which, of course, there is sometimes a reasonable excuse, especially when the help is given in kind.

It may be said that there is much social selection at present in operation, and that is true. The difficulty is that it is so often artificial, that it is related to the conditions of an age of mechanism. Man is becoming, partly through misguided selection, less of a man than he was. Social selection works in many cases in the wrong direction: it is not sufficiently rationalized and moralized. Thus, to advertise for a gardener "without encumbrances," or to dismiss a woman teacher because married, or to found Fellowships on conditions of celibacy, illustrate social selection working the wrong way.

There is great selective power in what may be called efficiency requirements, which should be insisted on with firmness. A standard of reliability is demanded in certain occupations; for certain transgressions a doctor's name is erased from the roll; for smoking in an explosives factory a man is instantly dismissed—and so on in scores of cases. It is only by multiplying these forms of rational

and social selection that man can hope to keep the good he has gained and go on to more.

Plainly, the dismissal of an unreliable workman or physician does not *necessarily* improve matters racially, for the man may slide into an easy job at a lower level, and have a large family like himself. Yet, on the whole, it works in the right direction. It is working against "arrangements which tend to make it as well to be inferior as to be superior."

Can we put the problem in its general terms? It is quite plain that it is good for man to struggle. Most things that are worth having are gained by struggle and are retained by struggle. In struggle there is selection in which the relatively fitter tend to survive. Only we must be clear that there are different modes of struggle: there is the attempt to master the natural difficulties of a geographical or climatic situation; there is competition among fellows; there is competition between man and man outside the circle of kinship; and there is that form of struggle in which man practises some form of mutual aid, either against Nature, or against other tribes, or against a section of his own tribe.

To our thinking it makes for clearness not to

make an antithesis between "struggle for self" and "struggle for others," but rather to recognize that in the perennial problem of overcoming difficulties and limitations, one method is to intensify competition and another method is to combine in mutual aid. Both methods pay, and both have served as selective sieves.

Now, within each of the two great forms of struggle—more or less individualistic or self-assertive and more or less altruistic or self-subordinating, there are many sub-divisions. Man has thrown off Natural Selection; he must substitute other modes of selection on both lines, and these must be thought out. This was the idea of William James's *Moral Equivalent of War*. Let us suppose that war has been a useful eliminator. It is now an anachronism, for it is a return, whether as a last resource or a first resource, to the crudest form of the struggle for existence, fellow trying to kill fellow. For the sifting of war, supposed for the sake of argument to be worth while, man must substitute the sifting of pacific enterprises which call for the lit lamp and the girt loin.

One feels that here may be a positive way out. Suppose not a "remnant," as in the Old Testament but a large body of the people, swayed ethically or

religiously by a fresh enthusiasm for the higher values, there might arise a sifting which would counteract the dwindling power of Natural Selection and strengthen the efficacy of those present-day siftings, e.g. towards the good workman, the reliable man, the thoughtful, which are operating in the right direction.

§ 6. Sex Selection in Man

There is a mode of sifting to which Darwin attached great importance, viz. Sex Selection. This means sifting with reference to mating, as when the male stags fight for the leadership of the herd and its privileges, or when the female bird exercises what seems to be choice and becomes the mate of one out of several suitors. Besides this preferential mating and the combats, there are other modes of sex selection. Darwin believed that important consequences had followed from the persistent and consistent favouring of the more courageous, agile, musical, or otherwise attractive males, and the handicapping of the unattractive. The theory has been much criticized, from Alfred Russel Wallace onwards, but it survives. Our question is, How does it apply to man?

A study of uncivilized tribes shows that the women often show marked preference for the suitor who is brave and strong. Head-hunting has been partly due to the desire to prove valour in the eyes of the women. Valour and strength, rewarded in courtship, will enhance the racial inheritance. Sometimes the quality that excites the woman's interest, admiration, and love is handsomeness; but the standard of this varies greatly. Darwin thought, indeed, that the splitting up into races had been partly due to varying criteria of the handsome or the beautiful. As beauty is in some measure the expression of vitality and of healthy harmonious living, preferential mating on a beauty basis would help the race in the direction of increased fitness. It also tightens the bonds of love, and in some peoples this is much needed. The preferential mating tends to be more in the hands of the women when the number of men is greater or approximately equal. If the women are in the great majority the selection is more in the hands of the men. It follows that causes which greatly increase the proportionate number of women, such as tribal wars, will decrease the sex-selection on the part of the women, and this tends to have a retrograde influence. On the whole, the

woman is more moralized and less impulsive, and more likely to choose wisely. Sometimes, of course, the man only fancies that he chooses. There is a moral sifting in woman's choice, but some fine types of women carry it too far, from the race point of view, by remaining voluntarily celibate.

§ 7. Eugenics

One of the programmes in the right direction, illustrative at least of a deliberate attempt to hold up an ideal of rational and social selection, is that of Eugenics. It will be admitted that health is one of the pre-conditions of higher progress, the fuller embodiment and realization of the higher values. There are noble individuals with very bad health, but an unhealthy race cannot progress or hold fast. Hence the importance of thinking about Eugenics. For the individual, there is no doubt that Eutopias and Eutechnics count for much, but Eugenics goes deeper, touching the race. Eugenics has for its ideal the improvement of the *race*, in mind and character as well as in brain and muscle. It is a very old ideal—in China, among the Hebrews, in many peoples and places.

What is practicable? We cannot choose our

parents, but more or less we can choose our partners; and there is utility in an enthusiasm for health in the widest and highest sense, and in a prejudice against parentage on the part of those with defects like deaf-mutism, well-defined mental instability, and certain forms of diabetes and epilepsy. One may not look forward with enthusiasm to demanding marriage-permits, or passing a marriage examination, or appearing before a peripatetic, matrimonial tribunal, with the family doctor as assessor. And yet there is terrible tragedy in sowing tares in a wheat-field.

But it is a little suspicious that it is always the other fellow, not oneself, that one thinks of as not likely to be a good parent.

Plato approved of the purgation of the State by the elimination of weaklings, and this may be justifiable and kindly in very clear cases. But what is biologically sound may be socially pernicious, for it may mean surgically removing consequences without touching causes, reducing responsibility, and shaking social sentiment. Moreover, even biologically, many weaklings have been the makers and shakers of the world—Sir Isaac Newton was a very pitiable infant—and Spartan proposals outrun our present secure knowledge.

On the other hand, when obviously undesirable types have fallen back on the community for support, it may be the duty of the society to keep them alive, but it cannot be its duty to let them multiply their kind. Of course one is not alluding to those impoverished by the hand of God or by any misfortune for which society is directly responsible. The cost of the Jukes family has been enormous, and sound types are handicapped by having to support the unsound. Almost no one seriously proposes elimination—though there are tribes where the chief *must* disappear if he becomes an invalid—but many would propose the prevention of multiplication.

It is not easy to suggest positive eugenic measures that are *practicable;* but there are possibilities of action which all would approve. Thus a community which realizes the racial value of fine types, of men, let us say, with high artistic gifts and vigorous physique, will, in its criticized expenditure, tend to secure their continuance. The applications of this economic idea of the *criticism of consumption* are endless and far-reaching. All expenditure which promotes unhealthy rather than healthy occupations, which helps to multiply undesirable types, which makes for sweated labour and slums

rather than for well-paid work and gardens, is necessarily dysgenic and not eugenic.

There is most hope, perhaps, in indirect methods, to get at the real through the ideal, to work back to the old-fashioned pride of race and pride in wholesome children, to cultivate a sense of the social and racial aspect of marriage, to foster rational prejudices against mismating, and to raise our standard of health alike for body and mind and character.

CHAPTER VIII

CONTACT OF RACES

§ 1. Races of Mankind.
§ 2. Were there Three Primary Races?
§ 3. Race-making.
§ 4. Climate and Geography.
§ 5. Biology of In-breeding and Out-breeding.
§ 6. Endogamy in Man.
§ 7. Exogamy in Mankind.
§ 8. Population Problems.

CHAPTER VIII

CONTACT OF RACES

§ 1. Races of Mankind

A race is a sub-species, a group of individuals with many features in common, and with a community of descent within itself greater than that between it and a neighbouring race. The Jews and the Japanese illustrate strong races, the Maoris and Red Indians dwindling races. A well-defined race shows variations around a central type.

A race is a biological group, a kinship group; but a nation or nationality is a sociological group, a political integrate with a geographical home, common interests, and some psychical unity. A nation may include several races; a modern nation is almost invariably the result of a complex mingling of races; in a few cases, like Swedes, nation and race are practically the same.

The chief races of mankind were established very early in prehistoric times, but there are relatively young races, such as the mestizos of Mexico, who have arisen from the mingling of Spanish and Indian blood. Race-forming continues to-day.

Human races are distinguished from one another by characters of skull, skin, stature, eyes, temperament, and so on; and a trivial character, such as the shape of a cross-section through a hair is often very diagnostic. But the problem of classification is baffling. Why should it be so difficult? First, because there has been so much mingling of races that clear-cut definition is well-nigh impossible. Moreover, in many cases, we can only guess at the crossings that have taken place. Who is this water-carrier in Cairo, Tylor asks, in his *Anthropology*.[1]

"This man speaks Arabic, and is a Moslem, but he is not an Arab proper, neither is he an Egyptian of the old kingdom, but the child of a land where the Nubian, Copt, Syrian, Bedouin, and many other peoples have mingled for ages, and, in fact, his ancestry may come out of three-quarters of the globe."

[1] 1881, p. 81.

Second, there is difficulty in the fact that similar new departures have arisen independently in different quarters of the globe, and may bring about resemblances which do not indicate close relationship, but only what zoologists call "convergence." Thus, it would never do to group all the Pygmies together, for mutations in the direction of dwarfishness seem to have occurred repeatedly in different races.

We deliberately refrain from any classification of the races of mankind—that is a problem for experts. It seems to us, however, that there is more likelihood of erring on the side of making too few than on the side of making too many. One of the recent investigators recognizes twenty-six. In Europe there stand out Nordics, Alpines, and Mediterraneans, who would be included as Whites or Caucasians. But then there are Lapps and Fins, Magyars and Turks, who are ranked by some classifiers with the Yellow or Mongolian races, such as Chinese, Japanese, Tibetans, Siamese, Burmese, Malayans, Brown Polynesians, Maoris, Esquimaux, and Red Indians. Then there are Hottentots, South African Bushmen, Central African Pygmies, and the divergent Melanesians and Australian black fellows—all sometimes ranked

together as Black or Negroid races. What is certain is that the genealogical tree divides at the top into numerous branches, and that these have interlaced.

§ 2. Were there three Primary Races?

We are familiar with the story of Shem, Ham, and Japheth, the sons of Noah, "by whom were the isles of the Gentiles divided in their lands; every one after his tongue, after their families, in their nations."[1] This was an interesting anticipation of a well-known anthropological classification into white, yellow, and black "primary races." To this classification many would still adhere, but there are reasons for leaving it alone. It does not work out well in detail. Trifurcation is too simple. Colour in itself is a treacherous character. As one of the great classifiers, Linnæus, said of his flowers: *Nimium crede colorem.* Do not trust much to colour.

But there is an interesting modern reason for being cautious in regard to the convenient idea of trifurcation. It has been urged by Sir Arthur Keith:

[1] Genesis x. 5.

"We are all familiar with the features of that racial human type which clusters round the heart of Africa; we recognize the negro at a glance by his black, shining, hairless skin, his crisp hair, his flattened nose, his widely opened dark eyes, his heavily moulded lips, his gleaming teeth and strong jaws. He has a carriage and proportion of body of his own; he has his peculiar quality of voice and action of brain. He is, even to the unpracticed eye, clearly different from the Mongolian native of North-eastern Asia; the skin, the hair, the eyes, the quality of brain and voice, the carriage of the body, and the proportion of limb to body serve to pick out the Mongol as a sharply differentiated human type. Different from either of them is the native of Central Europe, the Aryan or Caucasian type of man; we know him by the paleness of his skin and by his facial features—particularly his narrow, prominent nose and thin lips. We are so accustomed to the prominence of the Caucasian nose that only a Mongol or Negro can appreciate its singularity in our Aryanized world."

This passage sounds like an argument for the "Shem, Ham, and Japheth" view; but the distinctiveness of Negroid, Mongol, and Caucasian types is only outstanding when we forget the atypical and ignore the numerous races that have to be squeezed into the tripartite framework. But

this is not Sir Arthur Keith's objection. What he urges is that the racial differences may be less profound than they look, for they may be in part the expression of variations in the secretions or hormones produced by the ductless or endocrine glands. We know that an abnormal enlargement of the pituitary body, for instance, may bring about profound alterations in the character of face and body, hands and feet; the youth may become an unhealthy giant; or the proportions of the body may be disturbed; and the outcome may be a fat and ugly fellow.

"We are justified," Sir Arthur Keith says, "in regarding the pituitary gland as one of the principal pinions in the machinery which regulates the growth of the body, and is directly concerned in determining stature, cast of features, texture of skin, and character of hair—all of them marks of race. When we compare the chief racial types of humanity—the Negro, the Mongol, and the Caucasian or European—we can recognize in the last-named a greater predominance of the pituitary than in the other two. The sharp and pronounced nasalization of the face, the tendency to strong eyebrow ridges, the prominent chin, the tendency to bulk of body and height of stature in the majority of Europeans are best explained, so far

as the present state of our knowledge goes, in terms of pituitary function."

There is much that is speculative in this suggestion that racial differences may be correlated with hereditary variations in the ductless glands, but it does not increase our confidence in the idea of three "primary races." We have also to remember that diet may act on the endocrine glands of the individual, and that lack or abundance of vitamines may also have its modifying influence.

§ 3. Race-Making

If we assume the occurrence of variations or mutations, there is no theoretical difficulty in the origin of human races, which corresponds to the origin of domesticated breeds or wild sub-species of animals. In some way, very imperfectly understood, mutations arise, and there may be several of the same kind about the same time. If these new departures are well suited to the conditions of life, they will last, and their possessors will become more and more numerous. Let us recall Prof. Punnett's eloquent calculation. If in a population

of 10,000 wild animals in a district there were ten of a new and promising variety, which had a 5 per cent. advantage over the original forms, the latter would almost completely disappear in less than a hundred generations. That is to say, if sifting goes on persistently and consistently. With less stringent selection the new variety might continue to grow alongside of the old, or it might migrate to an area that suited it better and there become stabilized by in-breeding.

We have started with a more or less mysterious mutation welling up from the germinal fountain of change—it may be as the outcome of some penetrating environmental influence, such as change in climate and food; it may be due to some more spontaneous re-shuffling of the hereditary cards; it may be because of the loss of a card during the intricate manœuvres that the nuclear vehicles of inheritance go through during the history of the germ-cells.

But it is not necessary to go back to this central biological mystery—the origin of the really new. For new patterns arise by crossing, and this has been a frequent factor in the origin of new human races. As the consequence of migrations, raids, and trade, there have been many minglings of

mutant races, and thus new races have arisen—from exogamy or out-breeding.

It is interesting to recall the Genesis narrative: how "the sons of God saw the daughters of men that they were fair, and they took them wives of all which they chose . . . and the daughters of men bore children to them, the same became mighty men which were of old, men of renown."

We are apt to underestimate the possibilities of change implied in the mingling of two different races. The likelihood of some novel pattern resulting is great. If two parents differ in one contrasted character only, and that be Mendelian, the grandchildren may be of two, or at most three kinds, like the grandfather or like the grandmother, and possibly a sort of compromise between them (imperfect dominants). But if the two parents differ in two pairs of contrasted Mendelian characters, then there may be four different types among the grandchildren. Prof. Conklin writes:[1]

"When there are five such pairs of contrasting characters in the parents, there may be $(2)^5$ or 32 types of grandchildren showing various combinations of these five characters; when there are ten pairs of contrasting characters there may be

[1] *The Direction of Human Evolution*, 1921, p. 32.

$(2)^{10}$ or 1024 types of grandchildren. Between different races there are many more than ten unit differences, and thus with a relatively small number of mutant characters an enormous number of different combinations of the characters is possible in the offspring."

§ 4. Climate and Geography

The older views of the human races have been deepened of recent years by the geographers, including amongst them those, like Mr. Huntington, who have studied the evolution of climates.

Climate is a very important evolution-factor. In Mr. Huntington's *Red Man's Continent* it is pointed out that the American Indians are endowed with a relatively conservative type of mind. They are observant, patient, enduring, but lacking in originality, adaptiveness, inventiveness.

"It seems probable that the Indians owe much of their mental status to the fact that they apparently migrated from Asia to America by way of Bering Strait. If that is the case, they must have spent many generations in the extremely trying environment of the Far North where the January temperature averages 10° F. below zero,

and where the winter night lasts months. Such an environment is a terrible strain on the nerves. White men go crazy under it. To a man of quick inventive mind who always wants to be up and doing, the enforced monotony of the long, icy night is torture. His mind preys upon itself and in time gives way. The type that survives is the phlegmatic man who can sit idly for weeks inside his stuffy hut and not care whether anything happens or not. When they left the primitive home of man in Asia, the ancestors of the Indians presumably had minds like those of their neighbours who became the fathers of other races. When they emerged from their long sojourn in the Far North, however, they had lost some of their valuable qualities."

Now, this sort of interpretation is being applied all along the line to human races, to physical and mental energy, to the development of material resources, to industries, to man's mental outlook, and to his life-saving trekkings. Climate is an important factor, arresting and stimulating the development of civilization, especially in earlier days.

In her *Influences of Geographic Environment*, Miss Semple has followed Ratzel in showing how profoundly man's history has been influenced by

local conditions. Geography is the other eye of history.

§ 5. Biology of In-breeding and Out-breeding

In-breeding or endogamy, pairing among more or less nearly related organisms, is of common occurrence among living creatures in Wild Nature. It is bound to occur when there is anything like geographical isolation, when a few animals or plants are shut off on an island. In a few animals, mostly degraded parasites, there is self-fertilization; in many plants, including the highest, there is self-pollination. There is no hint that close in-breeding in Wild Nature has any deteriorative effects. There is very close and habitual endogamy among ants.

It is also known that some fine breeds of domesticated animals and races of cultivated plants have had very close in-breeding to start with, and yet they are vigorous enough to-day. If a thoughtful breeder of stock, who is not prejudiced by reading recent biological literature, be asked for his opinion in regard to close in-breeding, he will probably answer that it has its advantages and its disadvantages. Of course, he will say, if

there is an emphatic taint the in-breeding will spread it; and that is granted by all. In-breeding may even intensify the taint. The breeder will go to say that there must be no slackening in the usual elimination of weaklings. But if there is no taint, and if there is judicious selection, in-breeding will be advantageous in fixing characters. It will result in a uniform and stable herd of great excellence.

After a pause the breeder will go on to say that this must not be pushed too far, for prolonged and close in-breeding is apt to lead to reduction in vigour, resisting power, fecundity, and even size. Yet if the breeder be asked whether these disadvantageous consequences are actually induced by the close-breeding as such, or are simply brought to light and accentuated by it, he will probably answer that he does not go into things so minutely as all that.

But this is a very important question. Is the deterioration a direct consequence of the consanguinity of the pairings, or is there some other factor at work? The experimental result seems to be clear, that the close in-breeding of fine stock may be persisted in for generations without any undesirable consequences. It is not the consanguinity as such that is to blame. Yet the deteriorative

results are sometimes plain. To what are they due?

The answer requires a little patience. When there are in a herd, to begin with, a number of distinct hereditary factors relative to a particular character, let us say the colour of the hair or pellage, the automatic effect of the in-breeding is to separate out pure types, pure as regards that character. The hereditary stock-in-trade of the type included, let us say, black, white, yellow, red colour-factors from different ancestors, and forming a sort of compromise coloration. The result of a period of close in-breeding will be a segregation of black, white, yellow, red-haired animals. This is a theorem in Mendelism.

But one of these characters may be an undesirable one—a *black* sheep, literally and metaphorically. And it may be in relation to the others what is called a recessive; that is to say, it will never appear in the progeny when a parent with the undesirable character is paired with one that has not got it. Suppose the undesirable character was not blackness, but lack of pigment altogether, the whiteness of albinism. The albino animal paired with a pigmented animal has offspring all pigmented; which is what we mean by saying that

albinism is recessive to the presence of colour. In conditions of exogamy, then, the undesirable albinism is kept under or masked. But in conditions of endogamy the albinos are isolated out as pure types; the albinism is exposed. "These recessives are the 'corrupt fruit' which give a bad name to in-breeding, for they are often—very often—undesirable characteristics."[1]

In out-breeding or cross-breeding there is a chance that an undesirable character comes in from both sides of the house, "a double dose," as some authorities say, and this necessarily implies an undesirable offspring. But there is more chance that a parent with a minus and recessive character will mate with another with a plus and dominant character, for desirable forms must be in the majority unless the race is going to ruin. The undesirable character will be kept out of sight by the corresponding dominant.

In-breeding occurs and retrogression is observed; and then the damage is put down to consanguinity. But what really happened was this: "In-breeding tore aside the mask, and the unfavourable characters were shown up in all their weakness, to stand or fall on their own merits."[2] The result of experi-

[1] East and Jones, 1920. [2] *Ibid.*

ment stands clear: "in-breeding is not in itself harmful; whatever effect it may have is due wholly to the inheritance received."[1]

Now let us turn to out-breeding or exogamy. What does it bring about? The result is often an increase in the subtle quality called "vigour." Darwin was strongly of opinion that the gain in constitution derived from an occasional crossing was a more important biological fact than the loss that often followed close in-breeding, and modern experimenters have confirmed this shrewd judgment. Both for animals and plants, the out-breeding often has advantageous results, like those that reward a notable improvement in nurture, such as better diet or transplantation to a new soil. There is often an increase in "vigour," resisting power, size, and other good qualities.

According to some there is a physiological stimulus which makes the offspring more vigorous because its parents were strangers. But it is more probable that what happens is just a "pooling" of the good qualities of the two parents. A minus recessive on one side may be masked by a plus dominant on the other side, or perhaps there may be blending, or

[1] East and Jones.

two desirable dominant characters may strengthen one another's hands.

And there is another thing that out-breeding does. It promotes variability. The hybrid offspring may be a new thing and its offspring may be new. Sometimes the crossing seems to start "an epidemic of variations." On the other hand, the two parents may be so incompatible that the offspring is sterile.

§6. Endogamy in Man

There are many races in which mating with other races is disapproved of or prohibited. In some cases it is punished by death. But the radius of approved mating may be much narrower than the race. Marriage may be prohibited outside the clan, or outside the community, or outside the caste, or outside the class. In many cases the kind of marriage most approved of is a so-called "cross-cousin marriage"; that is to say, a man should marry his father's sister's daughter, or his mother's brother's daughter. There is no doubt that man has given much thought to enforcing some degree of endogamy.

Any why? Pride of race to some extent, antip-

athy to foreigners to some extent, likewise a fear of traitors in the camp, and also a dread of diminishing fertility or some other consequence supposed or real.

What are the probable facts of the case for man? That endogamy may go far among healthy stock, that it tends to stabilize useful characters, and that it makes for integration. This applies mainly to early days when man was less handicapped by taints. In recent times the frequency of hereditary taints makes endogamy undesirable. But the probability is that all strong tribes have had periods of strict endogamy.

§ 7. Exogamy in Mankind

Varied, elaborate, and stringent rules of endogamy forbid a member of a group to marry outside the group. But equally varied, elaborate, and stringent are the rules of exogamy which forbid a member of a group to marry inside the group. It seems contradictory, but rules of endogamy and exogamy may exist in the same tribe. The fact is, that the boundaries of the two groups differ in one tribe. There is an outer circle beyond which marriage is prohibited or disapproved of;

there is an inner circle within which marriage must not occur. Different peoples differ in the radii of these two circles.

Many theories have been advanced to account for the stringency with which it is often prescribed that a man must marry outside a particular circle. Supposed widespread destruction of female infants led to scarcity of women, and supposed widespread marriage by capture supplied the deficiency from other tribes. The prevalence of female infanticide and marriage by capture has probably been grossly exaggerated. Another view is that foreign wives taken as booty were trophies of prowess, and man's vanity made this a rule. Another theory is that clan exogamy arose as a prescription to avoid the supposed evil effects of too close endogamy and to preserve the decencies of life. But that was hardly the way men looked at these matters in early days.

The probabilities are surely in favour of Dr. Westermarck's simple and commonsense interpretation that there is rarely any attraction between near kin. When he asked his Berber teacher from the Great Atlas whether marriages between cousins were frequent in his tribe, the answer came, "How could you love a girl whom

you have always seen?" "Aversions which are generally felt readily lead to moral disapproval and prohibitory customs or laws."[1] Moreover, it is easy for a law based on biological and psychological facts to be extended by association to cases where its application is no longer justified by the original aversions or indifference. Thus neighbours may be prohibited from marrying. Dr. Westermarck believes that the aversion or indifference is based on the evil effects of in-breeding. Not that these were reflectively considered by simple peoples. The process was rather the fostering of those types who varied in the direction of repulsion to close endogamy and the elimination of those types who varied in the direction of attraction to close endogamy. The difficulty here is, that recent work does not corroborate the widespread conclusion that close in-breeding is injurious to the stock. But in man's case close in-breeding may have psychological and social consequences of a disadvantageous sort, though biologically it may go far without damage.

Perhaps it is enough to say that there is a certain circle, varying from race to race, and from age to age, within which marriage is not likely to be a

[1] *History of Marriage*, Vol. 2, p. 198.

success from any point of view. Variants who persisted in going within the circle—as pathological variants do still—would have unsuccessful marriages, and their type would never last.

We have now reached a breathing-point. Many races of men have—one might almost say—specialized on traditional rules or established laws forbidding marriage outside a certain circle, the radius of which varies from tribe to tribe, from time to time, from place to place. It is probable that these rules of endogamy have a natural basis in pride of race and a suspicion of the strange; and it is man's way to corroborate natural sanctions by inventing fictitious auxiliaries. Within limits, the rules of endogamy are sound because they tend to stabilize the race, to fix and diffuse desirable characters. Moreover, out of a mixed inheritance, the endogamy may segregate a variety of types; and this may make for a useful division of labour in society.

On the other hand, many races of men have—one might almost say—specialized on traditional rules or established laws forbidding marriage inside a certain circle, the radius of which varies from tribe to tribe, from time to time, from place to place. It is probable that these rules of exogamy

have a natural basis in man's, and of course woman's, aversion or indifference to love-relations between close kin, or even between familiar neighbours. To this man adds auxiliary prohibitives, which react on sentiments. Yet, within limits again, the rules of exogamy are sound, for the more successful marriages are those between people with strong physical attractions and complementary rather than merely duplicative attributes. Moreover, exogamy, within uncertain limits, promotes variability, which includes, among possibilities of retrogression, possibilities of advance.

But in the same people there may be endogamous rules and exogamous rules, both of which we, looking at them from the vantage-ground of civilization, recognize as having behind them some reasonable basis. Endogamy within limits is justifiable; exogamy within limits is justifiable. But we are dealing with antiquities, and there is a difficulty in understanding how two racial ideals of opposite outlook should co-exist in one people. "Breed in" is the one policy; secure that which is good. "Breed out" is the other policy; pool the gains of the ages.

The suggestion we wish to make is that these

two policies relate to different periods in the life-history of a people or tribe. There is a time when it is all-important to establish a firmly homogeneous race; there is a time when there comes a new lease of life in the variability induced by fresh blood. As regards the intermingling of distant races the biological evidence is clear—that happy results seldom follow.

§ 8. Population Problems

Even in ancient times fluctuations of the population were well known and occasioned much anxiety. In a limited area there were too many mouths to fill. This led to all sorts of expedients—exposing the children, abortion, emigration. Very important is the fact that overflowing population has often led to war. The Trojan war was definitely regarded as a timely solution of the problem of "a world too full of people." Famine and pestilence often halved the population. Or again, as in modern times, some device, such as irrigation or improved cultivation, greatly increased the food supply.

For a long time before the 18th century there was in Britain only a slow increase of the population or

an approximate equilibrium. There were more births than deaths in the country, which God made; and there were more deaths than births in the towns, which man made; and people used to refer to the providential adjustment.

But in the 18th century the established harmony began to be dissolved in discord. Between 1750 and 1800 the population of England and Wales rose from 6,500,000 to 9,000,000. This was associated with the sombre onset of the industrial age with its machinery and factories. The expansion reached its climax about the middle of the Victorian period. In the 19th century the population of England and Wales was more than trebled; in Scotland it rose from 1,608,000 to 4,472,000. One of the most stupendous of biological facts is that the population of Europe was 187 millions in 1800, 266 millions in 1850, 400 millions in 1900.

This extraordinarily rapid increase was due to a glut of material prosperity, a recklessness due to a de-humanizing of life, the advance of public health measures, and the economic fact that children of tender years went out to work, and that it paid to have them. They say that foxes approve of rabbits having large families.

So it came about that a generation ago people

held Population Meetings in big towns. The cry was that the world was getting too full of people, and there was manifold advice: marry late; practise prudence; individuate; leave things alone—the survival of the fittest, don't you know; and, from James Mill, to begin with, whispers of birth control. As usual, there is some sense in all the suggestions, though "marry late" was worst.

But every one knows what happened. The tide turned in 1877 in England, as men were arguing how to stem its advance. Decreasing birth-rate is now common to all the more highly civilized nations.

There are various aspects of this that must be considered by all serious students of man. The first is that it is differential. It is most marked in areas with the highest standard of living. In 1881 Hampstead and Shoreditch had an approximately equal birth-rate, 30 and 31. In 1914 Hampstead had fallen to 14.8, whilst that of Shoreditch remained at the old figure. The same tendency occurs in almost every town. The decrease of the birth-rate is much more marked in the upper and middle classes than among the poor and unskilled. The smaller the number of rooms the larger is the family, and the death-rate among infants is al-

ways highest where the birth-rate is highest. Where there is most to disqualify for parenthood, there the families are largest. This bodes ill for the race.

The causes of the dwindling birth-rate are multiple, e.g. age of marriage, duration of marriage, fidelity in marriage, economic conditions, a feeling of responsibility for children. It has been proved that the restriction is largely voluntary; it is probable that this means mainly restriction, not in the production of children, but in the number produced.

Many people to-day regard the decline of the birth-rate with as much alarm as their fathers regarded the continuous rise in the Early Victorian period. Probably with as little reason.

But much depends on how far the decline goes. It may make for stability by raising the health rate and lessening the strain on maternal health and domestic resources. As it is occurring all round among civilized races, it will not affect our place in the sun. Lessened increase removes one of the main causes of war. The most serious aspect is the differential decline. In the 18th century Benjamin Franklin said the average number of children in an American family was 8; among

college-bred Americans it is now less than 2. In Britain it is 1.9 in upper and middle classes, 1.53 in skilled workmen, 2.13 in unskilled.

Controlled birth-rate may tend to better the health of children and mothers; it may tend to increase the finer possibilities of life; it may make earlier marriage easier; it may better the position of women; it may work against war. Better 40 millions healthy, vigorous and joyous, than 60 millions riddled with bad health, weakness and depression.

What man has to look into is the method by which the birth control is effected, and the motives that lie behind restriction. But one thing is sure that while we must not allow the word artificial to be a bogey, the greatest thing in human life is love. There is no necessity that this should be jettisoned in adopting methods of birth control, but there is obviously a danger of losing something when we become too scientific. "If we lose the chivalry and tenderness of lovers, the joyousness of the Springtime of the heart, the adventurousness of early marriage, and the delight of having children while we are young enough to sympathize with them, we are missing the fragrant flowers of life."

But there is another matter perhaps more im-

portant still—the persistent increase in the number of the world's inhabitants. At present the population of the globe stands at about 1700 millions. But it does not stand; it is being added to at the rate of between 14 and 16 millions a year. The white race—so-called—is increasing much more rapidly than the yellow or the black; China's 300 million population remains practically stationary so far as we know.

We have to face the relation between the increase of the population and the standard of living. We have, in the recent past, evaded this by opening up new countries and by improving means of production and exchange. But there are limits to this, increasingly obvious since 1914. New discoveries may put things right—new agriculture, fisheries, bio-chemistry and so on—but no one can say that the experts are sanguine. What many see is the gathering of a dense cloud—the ominous predecessor of a terribly intense struggle for existence. The point is that we must not drift. The moral is that, in any case, quality is better than quantity.

CHAPTER IX

DISHARMONIES AND DISEASE

§ 1. Discontent with the Body.
§ 2. Disharmonies in the Human Body.
§ 3. Man's Attitude to Disharmonies and Disease.
§ 4. What Man Can Do in Regard to Disharmonies.
§ 5. The Promotion of Health.
§ 6. War.
§ 7. Social Discords.

CHAPTER IX

DISHARMONIES AND DISEASE

§ 1. Discontent with the Body

At different times and in different countries there have been periods of profound discontent with the human body. We read that to Buddha there came a

"vivid idea of the impurity of the body, a feeling of repulsion from it, and of blame of it. Regarding his own body and seeing its wretchedness, he began to despise it, and to formulate conceptions of impurity and purity; from the sole of the foot to the crown of the head, to the limit of the brain, he saw that the body was born in impurity, came from impurity, and always let itself be drawn into impurity."

So he concluded: "What wise man, having regarded his own body, will not see in it an enemy?"

Such a view finds many a parallel in many

peoples and at many times. The forms it has taken have been often very extreme, in theory and practice alike. Thus cleanliness often came to be regarded as very far from next to godliness; and the soul's partner was not only despised, it was mutilated.

The motives of this dualism run mad were various. It was sometimes an exaggeration of the reasonable desire to subdue the flesh; it was sometimes an attempt at divorce where harmony seemed impossible; it was sometimes, in conditions of misery, an expression of the hopelessness of bodily welfare; it was sometimes indicative of an impatience to be over and done with an irksome partnership. Though St. Paul used the strong phrase, "The body of this death," he suggests a sympathetic appreciation of the humbler parts of the body: "Yes, God has tempered the body together, with a special dignity for the inferior parts, so that there may be no disunion in the body, but that the various members should have a common concern for one another. Thus—

> if one member suffers,
> all the members share its suffering;
> if one member is honoured,
> all the members share its honour."

In any case, contempt for the body, the antithesis of the Greek ideal of a harmonious health of body and mind, was entirely wrong, except in so far as it expressed in a negative way an enthusiasm for a devout life.

§ 2. Disharmonies in the Human Body

Every thoughtful person is now agreed that the culture of the body is a worthy object of endeavour. We are no longer, in theory, disloyal to the body. "Her temple face is chiselled from within," that is the one side of the facts—the influence of morals on muscle. The other side of the facts is that avoidable handicappings of the body may keep the spirit from winning the race.

But those who are willing to take care of their body, as a musician of his violin, find themselves confronted by certain disharmonies, for which neither they nor their parents can be blamed. We owe to Metchnikoff a frank exposure of these disharmonies.

The shortening of the snout region in pre-human ancestors led to a crowding of the teeth, and a reduction in their number may be regarded as an adjustment. Thus the wisdom teeth or third

molars are often suppressed, and they are usually very late in appearing. In modern man they are of little use, but they are often the seat of disease. They are lingering too long. The troubles that arise in connection with them must be regarded as a tax we have to pay on our evolution.

In the same way the vermiform appendix is a relic. If it has a use, it cannot be of great importance, since people get on without it. But like other dwindling organs, it is the seat of frequent disease. There seems to be danger in any organ that becomes physiologically stagnant, left as it were in a backwater, away from the main current.

Furthermore, man's food-canal, of 30 feet or so, is far too long. It was adapted for coarser food more difficult to digest and to irregular meals. Especially is the large intestine in some measure an anachronism, and a frequent seat of disorder. Here again the structure of man is not keeping pace with changes in his habits.

What we have illustrated in regard to the alimentary system holds in regard to many other parts of the body. In many cases an organ that is dwindling away is particularly liable to be attacked by the microbes of disease, or in its own variability

it may exhibit involutionary or degenerative processes, often of a morbid nature.

But there is another kind of disharmony which appears to be associated with the extraordinary complexity of the body. The elaborateness of an engine, or of a contrivance like a watch, makes for integration and smooth working, but in the very complexity there are more possibilities for things going wrong. The castle-of-cards becomes more unstable as it becomes more complex. When the watch becomes a repeater-watch, and an alarm-watch, and an electrically lighted watch, and when it tells you the day of the week as well as the hour of the day, it is more likely to go wrong. So with very complex living structures like brain, eye, ear, heart, and so on. We are fearfully and wonderfully made, and there is a tax to pay on it. The chemical integration of the body by means of arousing hormones and soothing chalones is a very subtle business, making the body one in a manner almost as important as the integrative action of the nervous system. It secures harmony and smoothness in the everyday activities. But it has the disadvantage that a disturbance in one corner of the regulative system—say in the thyroid gland—may upset the whole life.

One of the lasting books in biology is Roux's *Struggle of Parts within the Organism*, which expounded amid much else the idea of a certain amount of competition among the various parts, a process of selection going on till approximate mutual adjustment is attained. The ingenious book, *Warfare in the Human Body*, by Mr. Morley Roberts, is on the same line. The body is a federation of organs and tissues, living in symbiosis, but there is still some hostility or selfishness in parts. A compromise is established, but the control is not perfect, and there may be disorder. Malignancy means imperfect control. Epithelium and connective tissue, according to Roberts, control each other, and their failure to do so is the real cause of malignancy. But all we wish here is the idea of a struggle of parts as a natural incident in an evolving body which has not attained to perfect integration.

Along with diseases of the body we must include diseases of the mind and diseases of the moral nature, which bring about disharmonies even more terrible than those in the body. For they affect what is most characteristically human.

Another disharmony is senility, which must be distinguished from senescence or natural old age.

Among wild animals there is often ageing, a waning of the powers, and the accumulation of fatigue-effects which have found no recuperation. But senility, which means the setting in of degenerative changes of a markedly disintegrative kind, hardly ever occurs in Wild Nature. Man and his domesticated animals have almost a monopoly of it.

A body that is worth having must have a good deal in the way of stable framework—what we might call the furniture of the laboratory. There are, for instance, the ultra-microscopical intracellular strands that circumscribe different areas in the colloidal melange of the cell, and allow various witches' cauldrons to continue boiling on the same microscopic fire; and then there are more familiar very stable furnishings like connective tissue wrappings, or like gristle and bone. Just because there are stable furnishings it is difficult to keep them in perfect repair. Fatigue arrears and strains gradually accumulate, especially in hard-worked organs like heart and liver, kidneys and brain. The organism gets into debt; natural death is its insolvency. It seems that what grows old is not the labile living matter, but the stable furnishings which it makes.

In very simple animals, where there is little or no

body to keep up, the recuperation of wear and tear seems practically perfect, and they probably enjoy exemption from *natural* death. In animals higher in the scale there are processes of rejuvenescence which counteract the processes of senescence so thoroughly that ageing is hardly perceptible. A sea-anemone may outlive a man. By processes of rejuvenescence we mean, for instance, sleeping through the winter, taking the body to pieces and building it up again, sacrificing a large part of the body and beginning over again. Higher still we find many animals that exhibit senescence without senility.

There is no boundary line, but we mean by senility a decline that has become disintegrative and retrogressive, when we do not merely "ripe and ripe," to use Shakespeare's phrase, but "rot and rot."

There is senescence when the bones become lighter and less resistant, the muscles weaker and stiffer, the nervous system slower and less forceful, the heart less vigorous, the arteries less elastic, and the mutual responsiveness of parts less sure. But there is no senility here, and many a man, old in years, is very young at heart when he dies. Such an one is a progressive pioneer variant point-

ing to what will probably be a normal racial character some day to come.

But there is just a little more than senescence in the famous picture in Ecclesiastes.

"The mind and senses begin to be darkened, the winter of life approaches with its clouds and storms, the arms—the protectors of the bodily house—tremble, the strong legs bow, the grinders cease because they are few, the apples of the eyes are darkened, the jaws munch with only a dull sound, the old man is nervously weak and startled even by a bird chirping, he is afraid even of hillocks, his falling hair is white as the strewn almond blossoms, he drags himself along with difficulty, he has no more appetite, he seeks only his home of rest, which he finds when the silver cord is loosed or the golden bowl broken."

Now, why should there be senility in man and not in wild animals? Partly it is a tax on his high degree of individuation, partly it is the Nemesis of too sheltered a life, partly it is because the physiological debts are of a very depressing nature owing to man's frequent artificiality of life. Plainly, the continuance of senescence into senility would not be tolerated under Nature's régime. It is a disharmony in man, and it is a penalty for

throwing off the yoke of Natural Selection without substituting for it some other form of sifting, such as is discovered by those who are sufficiently enthusiastic about healthy living.

§ 3. Man's Attitude to Disharmonies and Disease

No one is willingly uncomfortable or ill, and in every age man must have tried to find some remedy. But until recently, tethered closely by ignorance, he could do little except try to live a natural life, and, when that failed, offer gifts to the gods or the witch-doctor, or, under more enlightened conditions, endure patiently. It is difficult for us to think back to the time when most diseases were quite inexplicable visitations, when there was no germ-theory. As Sir Ray Lankester says, when gaol-fever or typhus spread to judge and jury, people spoke of the Angel of Death, whereas we speak of a microbe carried by the clothes-louse.

Close-tethered for lack of knowledge, man tended in his distress to think much of higher values and their conservation, and we find pre-occupation with this solace making people heroic all the world over, though it reached its climax in Christianity.

To others all that was possible was endurance, with the hope that the dross might be coerced out of them. These disharmonies, sufferings, diseases, what are they but disciplines by which man may be more fully the captain of his soul?

But the modern view, while not antithetic to the religious and ethical consolations, strikes another note—that of the control of life. It is certain that *many* of the shadows and disharmonies of human life can be got rid of if science and good-will join hands resolutely. The application of sound science can do much to remove shackles which inhibit the higher adventures of the human spirit. "Many evils," said Maarten Maartens, "are not of God's appointing, but of man's approving."

We have mentioned some of the specific reasons why man is so subject to diseases and to senility. Can we generalize in any way?

Just as moral evil is to some extent at least the tax that has to be paid for moral freedom; just as mental instability is to some extent at least the tax that has to be paid for genius; so the constitutional diseases of mankind are to some extent at least the tax he has to pay not only for his complexity but for his readily stimulated variability.

In some measure, then, man's liability to disease

and senility is a tax on his complexity. But another reason is to be found in man's restless experimenting and in his artificiality of life. He is always trying experiments in food and drink, in work and exercise, in homes and habits. Some of his experiments lead to highly artificial nurture, which even his plastic constitution cannot stand.

Then, again, instead of having specialized instincts like many animals, he has, to our thinking, in most cases only *generalized* inborn tendencies. This makes him peculiarly liable to stumble. He has, for instance, very little resting instinct, very little awareness of when he is over-taxing himself. It is intelligently, not instinctively, that he has come to know that insomnia and pain are danger-signals. He uses devices to paralyse his sense of fatigue. He is very unaware of what is good for him. It is obvious, of course, that sensible people make up for their lack of instincts by cultivating good habits.

But the biggest reason for man's liability to disease and senility is what we have already discussed. In a magnificent way he has rebelled against Nature's régime, but he has not put in its place an adequately effective rational and social

selection. A tragic constitutional disease appears in a family, shattering hopes and blotting out the sun: this is *sometimes*—not, of course, always—due to some one in the lineage who should not have become a parent. It may be due to a breakdown in the particularly intricate organization; it may be due to imperfect adjustment between the body and the rapidly changing conditions of life; but it may be due to some inherited perturbation which ought never to have been handed on. Man has not learned to select with sufficient stringency in the direction of health.

§ 4. What Man Can Do in Regard to Disharmonies

Diseases are of three kinds—microbic or parasitic, modificational, and constitutional.

(*a*) Microbic or parasitic diseases are yielding before science. This year they are celebrating the centenary of Pasteur, one of the greatest life-savers of the world. In many a place malaria has been conquered by pouring petrol on the water-pools. The danger of diphtheria has been greatly lessened, and so with many diseases like cholera and plague, smallpox and splenic fever. There can be little

doubt that sleeping sickness and other deadly diseases will be baulked. In some places, between 1902 and 1914, the deplorable disease brought on by "hookworm" has been lessened from 25 to 3 per cent. of the population; in other places from 22.8 to 1.2 per cent. Dr. Leiper's discovery of the life-history of the formidable Bilharzia worm has made it possible to check the ravages of this parasite—another of man's serious enemies.

(*b*) Then there are modificational diseases due to something pernicious in the nurture, i.e. environment, food, and occupation. But these are being conquered also. Thus, one physician, Sir Thomas Oliver, has done big things to counteract white-lead poisoning, and this is merely a notable instance out of many. Or, again, the discovery of vitamins has saved many children from mysterious wasting—due to the absence of these potent substances or qualities of substances from the food. Physiologists have gone a long way to conquer beri-beri, due to eating polished rice grains from which the vitamin next the husk has been rubbed off.

(*c*) Even in regard to constitutional diseases, which arise from some germinal perturbation or defect, something can now be done. The cretinoid

child, terribly handicapped by the thyroid gland going out of gear, can in some measure be cured by extraneous supplies of thyroid from sheep or calf.

§ 5. The Promotion of Health

In Wild Nature there are many means of promoting health which civilized man cannot exactly imitate, but he can do something analogous. He cannot rest for half the year as some animals do, but he might rest more than he does. Of course, for men under sixty, rest should mean in great part a change of activity. It is interesting to notice that in the half-domesticated hive-bees, the socialized mania for industry leads to the brain going rapidly out of gear through over-fatigue. In man, most cases of nervous breakdown are preceded by periods of "nerves" during which the body is sending many warnings to headquarters.

Man cannot indulge in the extraordinary bodily spring-cleanings by which many animals secure a continuance of youth, but he can do a good deal towards remaining young by insisting on more holiday and change, more real *recreation.*

Man cannot surrender a damaged part as many animals do, who give off a member and thus save

their life. But there are other things that can be "cut off" besides members of the body.

We admit that many doors open to animals are closed to man, but these are not closed so tightly as some people think. Rest, change, giving up luxuries are often possible.

Let it not be thought for a moment that we are repeating the old cry, "Back to Nature." There is sense in this if it means simpler living and less artificial excitement, more open air, more change; and if it means getting back with the inner man into an original relation with Nature and responsiveness to her voices. But the fallacy of the cry is in failing to see that what man has to do is to meet the novel conditions of modern life. Some of these conditions must be changed, but in the meantime we have to adjust ourselves—protectively at least—to them.

There is no lack of detailed hints from wise men as to the ways in which better health of body and mind may be secured. What is lacking is an adequate enthusiasm for health—positive health. But it is growing.

What has been said in regard to counteracting disease applies in a measure to evading senility. Man must age, of course, but he can to some extent

control the nature of the wear and tear, the clogging and ashes from which those who are ageing suffer; he can cultivate the resting habit—in moderation, of course, for the man who never tires himself sometimes ages into a vegetable. Man can to some extent—to an ever-increasing extent—secure those changes which make for invigoration and rejuvenescence. Man can determine what he will *not* die of!

§ 6. War

Another great disharmony is the tendency to warfare. Here we must perhaps distinguish somewhat sharply between the primitive tribal wars and their modern successors. It is quite likely that tribal wars had their utility, especially as they were sometimes carried to a bitter end. If a tribe persisted in treachery, cruelty, cannibalism, and so forth, perhaps it was not great loss that it should be wholly removed. Such eliminations seem to have happened. Tribal wars may sometimes have made for integration.

Another point to be considered is how far the war-clash between races was a factor in civilization. About the time of the publication of the

Origin of Species,[1] Mr. Stuart Glennie promulgated his theory of the conflict of races, the gist of which, as already mentioned, is this. In Chaldea and in Egypt, some 10,000 years ago, Colonists of a Higher Fair Race settled among Aborigines of a Lower Dark Race. They acquired influence over them, compelled them to work under direction, enforced organization of food-production and food-distribution, and reached intellectual development and the growth of civilization. This happened not once but several times, and was the origin of the great civilizations.

It will not do us any harm to recall a well-known panegyric of War from Winwood Reade's *Martyrdom of Man*[2]:—

"By means of *War*, the animated life was slowly raised upward in the scale, and quadrupeds passed into man. By means of War the human intelligence was brightened, and the affections were made intense; weapons and tools were invented; foreign wives were captured, and the marriages of blood relations were forbidden; prisoners were tamed, and the women set free; prisoners were exchanged, accompanied by presents; and thus, by means of War, men were first brought into amicable relations with one another. By War the tribes were

[1] 1859. [2] P. 502.

dispersed all over the world; by War tribes were compressed into a nation. It was War that founded the Chinese Empire and developed the genius of Greece. It was War which planted the Greek language in Asia, and so rendered possible the spread of Christianity. It was War which united the world in peace from the Cheviot Hills to the Danube and the Euphrates."

The case could hardly have been better put *in irony*.

As to modern warfare, we recognize that it may be necessary in a righteous cause, but we must also recognize that it is a retrogression to the crudest form of the struggle for existence. Moreover, we must notice that the value of modern war as a selective agent is quite unproved. To the call to arms the fittest respond; if the wars are long or oft-repeated, as in the case of Rome, the race is continued most by the men who are left, who do not tend to be the best. The women counteract this disadvantage in some measure, but in a belligerent country they often suffer beyond telling. The finest companies or regiments are ordered to do the most hazardous things, and thus the fittest are eliminated. There is much sheer fortuitousness, but other things equal the bravest tend to be killed. Moreover, the issue is not as in Nature; it

is rare for the conquered to be so reduced that the population cannot make good the numerical loss in a few years. Moreover, the issue depends in part on non-organismal characters, such as financial stability. Again, there is no guarantee that a fine small nation may not be terribly reduced by a large nation against which it has no chance at all. And again, in the victorious people the subsequent economy often presses cruelly on the finest types, and causes widespread celibacy.

Socially regarded, a righteous war may be at once an expression and a discipline of many and high virtues in combatants and non-combatants alike. Biologically regarded, it is a reversion to the crudest mode of the struggle for existence. In many ways it is dysgenic; selecting in the wrong direction, reversion dragging evolution in the mud.

To lean our weight against its recurrence seems a plain duty. We must try to promote internationalism without losing nationalism. We should seek to appreciate the significance of movements —like the Students' Christian movement—that tend to re-affirm that mankind has very big things in common, and tend to bring different nationalities together. Common enterprise of a noble sort is always integrative. The League of Nations may

be capable of improvement, but *as an ideal* it is unassailable.

§ 7. Social Discords

But we are still far from being near the end of man's disharmonies, for there are all the discords of the body politic. The social and economic disharmonies are so many and so complex that few of us are physicians enough to tell what is mainly wrong, and none of us knows more than a little bit of the cure. Admitting the absurdity of any brief discussion of social discord, we nevertheless venture to make four remarks, two on the minus side and two on the plus side.

First, we must keep in mind the extraordinary intricacy of our social system. When there is such complexity there is room for many things to go wrong. There are heterogeneous interests and outlooks and types. The web of life is subtly woven, no one can tell what may happen when a thread rots or gets outworn. Man has built up an extraordinary external system outside himself, which is like an engine that he cannot control on a hill—up or down. The evolution of his external system has got out of hand.

Second, it is not a matter that can be proved or

disproved by statistics, but there is much that points to the conclusion that there is in the world to-day a larger volume of social good-will than ever before. There are, no doubt, many people who live at a low level; there are survivals of robbers and pirates and other predatory types; there are people still whose god is their belly; and so on. And, as George Eliot said: "We are not ourselves the finest marble." But there is a widespread desire for justice and fair play, if one only knew how; a strong sense of social solidarity. There is that to draw on.

Suspicions remain between different sections, but perhaps they are not so dogged as they once were. We know that they can be laid aside in the common service of a great cause. What is more lacking than good-will is clear thinking. Many have only a mole's vision—a blurred vision of the social disharmony. More sociology is imperative.

Third, it has to be kept in mind that we have entered upon a very difficult and perturbed social heritage as the result of the industrial revolution. In Dr. Austin Freeman's *Social Decay and Regeneration*,[1] there is a relentless exposure of the effects of the power-machine on industry. The

[1] 1921.

skilled craftsman disappears; small local industries are crushed; handmade products vanish; the standard of production sinks; there is a growth of wasteful habits and disrespect for the products of the machine; the public taste is lowered; and so on. Dominant mechanism has degraded man and vulgarized his works; it has made social parasitism easy and unrest certain; it has led to subhuman crowding and sub-organic ugliness.

On the other hand, in the fourth place, there are vigorous attempts to make things better. People like the Cadburys are merely prominent figures in a magnificent set of experiments to get away from the aftermath of industrialism. But this will carry us farther than we know. The doctrine of equalitarianism is biologically false; the hope of progress or security without sifting is vain; but we must face the gradual onset of a happier régime when rewards will be more widely shared and life become all round more of satisfaction in itself.

To the general tenor of what we have said two reasonable objections may be urged. It may be said that too much emphasis has been laid on the body and its disharmonies, and that too little has been said of the spirit. The rebuke may be

accepted, provided it be understood that from the scientific point of view it is imperative to lay stress on *the unity of the organism.* A clot in the brain may be a blot in the mind. A disturbance of the regulative endocrinal system may perturb the whole man. However their relation should be stated, body and mind go hand in hand as partners in life. The scientific hope is to reduce remediable disharmonies, such as many diseases, so as to leave the spirit of man free from gratuitous handicaps, so that it may go on to higher adventures. This is a worthy hope: to lay aside every weight.

Another reasonable objection is that nothing has been said of the greatest disharmony of all. And that is true—nothing has been said of Sin. But let us be careful to recognize what the scope of science is in these matters. Science may say to a man: If you persist in that behaviour you will disintegrate your organism and your bad debts in senescence will be of a very disagreeable kind—they will spell senility perhaps. But science, as such, has no right to call him a bad man or a sinful man; for those words introduce ethical and religious values which are beyond the strictly scientific universe of discourse.

A man of good repute and fine life sometimes makes shipwreck; we are all aware of eddies which force their way up from the unconscious and make a whirlpool in our upper life. Now it is of some value to have it explained to us by the medical man or by the psychologist that something went wrong with the regulative system, and that passion swept a previously well-controlled ship on the rocks. It is of value to have it explained that a strand—a living but ancient strand—in our complex personality, which had remained subordinate all our life, has suddenly become like "proud flesh"—a source of irritation and trouble. It makes the moral life less of a puzzle to recognize that some evils are, as it were, the untimely awakenings of normally sleeping buds. We do not suggest that there can be any lessening of responsibility, for we are responsible for our bodies just as much as for our character, and man—if he is anything of a man—cannot lay aside his prerogative of summoning all his doings before the tribunal of his critical and controlling moral self. But we may plead extenuating circumstance; we may understand that the good man who did a foul thing was not a lifelong hypocrite; and we may take off our scientific spectacles and say, "There, but for

my parents, my wife, my friends, my teachers, my church—there but for the grace of God go I."

But all this falls quite short of the religious man's concept of sin—a concept bound up with the highest values—and therefore far beyond the reach of science. As human beings we may ask ourselves, are we deliberately turning our face away from the sunlight of God?—for that is sin; but as scientific inquirers we cannot ask that question.

CHAPTER X

WHAT IS MAN NOT?

§ 1. What is Evolution?
§ 2. Trends of Evolution.
§ 3. Is Evolution Going to Stop?
§ 4. What is Progress?
§ 5. How May Mankind Make Progress?

CHAPTER X

WHAT IS MAN NOT?

§ 1. What is Evolution?

Organic evolution means that the present is the child of the past and the parent of the future. It means that our present-day fauna and flora and their inter-relations have arisen without gaps, though not without leaps, from simpler antecedents which were their entire pre-conditions. Organic evolution is a continuous natural process of racial change in a definite direction, whereby distinctively new individualities arise, take root, and flourish, alongside of or in place of the originative stock. The concept includes man, though the factors in his case have changed greatly because of reason, society, and purposeful control.

What must be clearly understood is that evolution is not *necessarily* in the direction of increased differentiation and integration. That has been its direction on the whole, but there has been

evolution in the other direction also, in adaptation to parasitism and sedentary life. Sometimes, moreover, there are corners in classes where there has occurred an exuberance of detailed variation within a short radius—the sort of thing we see in the inorganic world among snow-crystals. The results, e.g. among flinty sponges or among corals, are often extraordinarily beautiful, but even to the naturalist's eyes they have not much significance, and they do not lead on to anything else. Another important fact to be kept in mind is that some of the most striking achievements are those of lost races, forms entirely extinct and without any direct descendants, though it may be that some of their virtues are continued along collateral lines. But we have no warrant for saying this in regard to such triumphs as the Pterodactyls.

§ 2. Trends of Evolution

We must not hypostatize evolution, for it is a process, and it cannot have a purpose or end of its own. In animals we recognize instinctive purposiveness or intelligent purposefulness, but *if* we speak of the purpose of evolution we must mean a divine purpose.

Yet we recognize what may be called great trends in evolution—lines of change which are repeated at different levels. Thus there is the continual trend towards more perfect adaptations between the organism and its environment, including in the adaptations a mastery, an increased utilization, and an extension of the environment. Another trend is towards establishing inter-relations, the linking of lives together, the weaving of a web of life, which has in some cases, e.g. the linkage between flowers and their insect-visitors, been a means of making gains secure. Another trend is towards an increasing intimacy of relationship between parents and offspring, as seen, for instance, in seed-bearing plants and viviparous mammals, which makes an entailment of parental riches practicable. Another trend is towards finer and finer beauty. Another trend is towards sociality—vegetative colonies, the integration of these, enormous families, communities of families on the instinctive basis, and intelligent communities. But most characteristic of all is the trend towards an increasing dominance of the mental aspect of life, towards the emancipation of the Psyche. This takes in part the form of enregistering capacities—as in reflexes, tropisms, and true

instincts, as also in the memories and habits of the individual lifetime, as also in as much of the primary unconscious as forms part of the inheritance. The enregistration may be carried too far, as men judge values, when instinctive behaviour is so extensive and sufficient that there is very little intelligence. But alongside of the enregistration there is often a setting of the mind free for higher adventures in intelligence, just as a very busy man cultivates very methodical habits so that he may have an alert mind free for rapid thinking.

What is plain is that in spite of blind alleys, in spite of retrogressions, in spite of lost races, life has been on the whole creeping upward. As age has succeeded age, nobler and finer individualities have appeared, with more mastery, freedom, and mind.

§ 3. Is Evolution Going to Stop?

Notwithstanding our professed evolutionism, we are often only half-believers. We think it is going to stop. We bow in the temple of the God of things as they are. We say with the Speaker in Ecclesiastes: "What has been, shall be; what has happened already, will happen again; there is not a novelty under the sun. When anything

occurs that one is disposed to call really new, it will be found to have happened already—ages before us."[1]

Why do we talk thus? It is partly because man's intellect does not appear to have improved since the days of Aristotle, nor his art since the time of Phidias. It may be, however, that the number of very intelligent and artistic men and women now living is much greater than in Ancient Greece, just as there may be more poets in the world to-day than in the time of Shakespeare, though none to be compared with him.

But is not all this forgetting how short the whole historic period is when compared with man's great antiquity? It is not in a few millennia that we can expect to see great organic changes. Moreover, we must always keep in mind the feature that is so distinctive of man, that he has altered the centre of gravity of his evolution by enregistering so much outside himself in his higher environment or social heritage.

At the same time it is difficult to criticize away the impression that the days of big lifts are over. It is a remarkable fact that Silurian rocks contain fossil remains of most of the great groups or

[1] Ecclesiastes i, 9–10.

phyla of backboneless animals, and likewise representatives of backboned animals in the form of fishes. All the big groups or phyla appeared many millions of years ago, and there has been no new *class* of animals since mammals appeared in the Triassic and birds in the Jurassic. What has been happening since then?

There has been increasing differentiation and integration in particular classes, such as mammals; we know the pedigree of horse and elephant and the like; we know a little about the ascent of man. There have likewise been some other forms of evolution—the rise of new species, the suppression of old ones, the diffusion into new territories, the increasing perfection of adaptations, and the complexifying of the web of inter-relations. Big lifts may be over, but there is no question of evolution having stopped; variations still emerge in abundance, and Nature's sifting still goes on. Everyone sees what man has done in a short time in establishing by artificial selection new breeds of domesticated animals and new races of cultivated plants. The Marquis wheat is probably as much superior to the wheat of the Middle Ages as that was superior to the wild wheat of Mount Hermon.

In the sense of change there is plenty of organic

evolution going on to-day, though there are old conservative types that do not seem to change at all, and have remained the same for millions of years as far, at least, as their hard parts are concerned. The Lampshell Lingula seems to have remained the same since the Cambrian, many million years ago. This conservatism probably means that a fine balance of constitution was reached very early, and that the adaptation to the conditions of life was very satisfactory. Variants would tend to be eliminated.

There has been no new *class* since the Triassic and Jurassic, but there have been many new types of great excellence. What seems probable, however, is that no startling new departure in general bodily structure is likely to be exhibited by a highly differentiated type, except in the way of reduction of parts. It is from generalized types that startling new departures on the plus side may be looked for. It is quite safe to say that a horse will never evolve into a winged Pegasus, it is far too highly specialized; but the collared Australian lizard, which is at present making experiments in bipedal progression, might conceivably give rise in a couple of million years to some highly interesting novelty.

How does this apply to man? His body in the higher races is very different from that of the slouching men of Neanderthal, and it continues to change—mainly in the way of reduction. It is quite likely that man may lose his wisdom tooth and his little toe; it is quite likely that some of the relics that he carries about with him may disappear altogether, and they would not be missed; it is quite likely that his inconveniently long food-canal may be shortened. On the positive side there seems no reason to believe that his brain has reached the end of its evolution. There are areas for which we can suggest no use. Man may be no abler than in the days of the ancient Greeks, but that does not prove that new linkages and orchestrations of nerve-cells are impossible. Man's hand is very generalized, but it is unlikely that it will become specialized, since its particular value, with a clever brain behind it, is just its plasticity.

On the whole, anatomists do not look for startling changes in man's general bodily structure.

§ 4. What is Progress?

We commonly say that birds are *higher* than the reptiles from which they sprang. What do we

mean? We may mean that they are more differentiated and integrated organisms, i.e. more complex and more controlled. Many people would stop there. This, they say, states the objective fact. If we are asked, however, why it is higher to have a more complex and controlled organization, we may answer that improvements in differentiation and integration make for a life of greater fullness and freedom—which birds certainly have. And if we are asked why the attainment of a life of greater fullness and freedom spells progress, is there any answer except that these are ends which mankind at its best has always valued? So it comes to this, that progress is a sociological concept derived from human history.

Now the achievements in which mankind has found most satisfaction are, first of all, good health and comfortable wealth, i.e. a full and free life; and then a realization and embodiment of the higher values—truth and the seeking for it, beauty and the enjoying and making it, goodness and the doing of it. In these the best have found most satisfaction.

But we may take advantage of scepticism as to progress to improve our definition. Critics point out that many a big change in mankind, like

industrialism, has probably done as much harm as good; that many changes have been very miserable at the time and of dubious benefit when effected. We look round and see disease, bad health, low vitality, dullness, insufficient food, slums, miserable homes, disharmonious domestic life, unemployment, unhappiness at work, boredom at leisure, and how much more that does not seem consistent with progress. We must, therefore, add to our definition. Progress must include *social* integration; it must include *more* chance for all to share in it. Our definition broadens. Progress is a balanced movement of a social whole towards the fuller embodiment of the supreme values, and at the same time a more all-round realization of the physical and biological preconditions, namely, the wealth and health which secure stability.

There seems value in recognizing the pre-conditions—wealth and health—as fundamental to the supreme values. Not that seeking them *first* is necessarily always right. As Prof. Geddes insists, biologists are apt to put things the wrong way round—things before life, the body before the spirit. Seek first the Kingdom of God if you would establish a better Kingdom of Man. Ye

must be born again. A new heart, before a new earth; so Eupsychics—good education—may be the shortest way to Eutopia, or good environment. Eugenics (good breeding) does not *necessarily* engender a good heart. A moral uplift may improve the health. The surest way to the real is often through the ideal.

Yet there is sound sense in emphasizing that a fuller realization of the supreme values will not be stable or all-round unless there is a general sharing in good health (in a high sense) and sufficient wealth (i.e. adequate command of energy) to allow of some leisure and enjoyment. "A poor life this, if full of care, we have no time to stand and stare." Is even beauty of great price if we have not time and peace of mind to enjoy it?

Would it be progress to have a race of very wise men and women, *all invalids?* Would it be progress to have a beautiful race, but relatively sterile? Would it be progress to have a very good race, but without joy?

It is a step towards clearness that all secure biological advance must be along the three lines—organism, function, environment: folk, work, place: to be supplemented by improved social organiza-

tion, and likewise by progress in the Kingdom of the Spirit.

Vigour is a Eugenic ideal, but a vigorous serf is not a human ideal; nor is vigour in an ugly place a satisfactory result. A beautiful countryside or a beautiful city is a Eutopian ideal, but it is not a human ideal if the people are all toiling and moiling unrelieved by joy. Wholesome occupation is a Eutechnic ideal, but it fails of human completeness unless the workers have good health and pleasant homes. Progress is not one thing, but many. It is imperfect in proportion to its particulateness.

No one would maintain that mere carrying on or struggling on was progress, but the history of mankind shows much more than that. In the course of time man has attained to a wonderful mastery over the forces of Nature, a victory over famine and disease, a firmer foothold in the struggle for existence, and some measure of solidarity within groups. These are certainly gains, but the difficulty in calling them progress is that they are heavily taxed. To conquer the forces of Nature is well, but man uses his science for the destruction of his fellows after a fashion which the so-called cruelty of Nature never approaches. To

conquer famine and disease is well, but it leads to a proletariat and to a multiplication of the unfit. To gain a firmer foothold in the struggle for existence is well, but it leads to easy-going slackness—physical, intellectual, and moral. To attain to solidarity in a societary group is well, and yet it may mean a good deal of servile acquiescence. There are always taxes to pay on progressive advances. Again, we reach the same conclusion that progress is rather an ideal than a fact; it is not one thing but many; it means an all-round balanced movement towards two fundamental and three supreme values.

Here we discover a principle—a critique of progress. Every social change must run the gauntlet of successively higher criteria. Is it sound physically, biologically, psychologically, socially? Sir William Ramsay declared that "real progress consists in learning how better to employ energy—how better to effect its transformation." That is a fundamental criterion, but one has, of course, to inquire how the more economical utilization of energy is affecting the workmen who bring it about.

The principle of guidance is this—judge the physical in the light of the biological; and the

biological in the light of the psychological; and the psychological in the light of the social; and bring all before the august tribunal of the true, the beautiful, and the good.

When we assert confidently that birds show great progress when compared with reptiles, we are either using a quite objective standard of greater differentiation and integration, or we are projecting on the animal kingdom a concept derived from human history. For progress means the fuller realization in an all-round balanced way of what the racial consciousness has most persistently held to be of the highest value. But it is of great interest to inquire whether there are in Animate Nature any trends in the direction of what man regards as progress.

When we peer closely what do we see? Nature is for beauty—it is her hall-mark on harmonious orderly living. Nature is all for health, and health leads to truth-seeking. To whom, thirdly, does Nature give her greatest rewards but to birds and mammals, among which we find predominantly good parents and good kin, and those that do at least practise self-subordination and finding the self in losing it? It is no amoral evolution that is behind us.

§ 5. How May Mankind Make Progress?

Let us suppose that the population does not continue to increase at its present appalling rate of 14–16 millions a year. Let us suppose that improved agriculture and fisheries, discoveries in bio-chemistry, tapping new sources of energy, and so on, produce enough of wealth for all who will work. Let us suppose that by profit-sharing and the like the producers get a reasonable share of what is gained, as well as a generous wage, while the brainy organizers and discoverers also get their due rewards. Let us suppose that this comes about without any nonsense about people being equal in ability, without any equalitarian fallacies. Let us suppose that it comes about without any coddling of the lazy, but with sifting to this extent at least that if a man will not work, neither shall he eat. We are not supposing a socialistic régime; but merely stating the plain fact that the conditions of the wage-earners must be re-adjusted towards greater sharing in gains. Let us suppose that a grasp of energies along with economy in the using of them allows of some public investments of wealth in the way of noble cities, re-beautified country, and

the like. There is nothing whimsical in all this.

Suppose in the second place that man gets rid of most or all of his microbic and modificational diseases. Suppose that by kindly firmness he stops the multiplication of the radically unsound, not by any elimination of course, but by segregation and by public opinion. Suppose he gets a fresh start in a few centuries, freed from many of the constitutional disabilities which are being more and more diffused as things are. Suppose man takes himself in hand more firmly, with an enthusiasm for vigour, for being physically more perfect. All sorts of disciplines, from breathing exercises to hard work are possible. Suppose a continuance of the modern movements towards better conditions of work, better houses, reasonable hours, more play, more beauty-feasts, more change. Suppose man learns afresh to endure hardness and attains to a positive health which he enjoys. Let us suppose also that he learns to die young. But his ideal of health must include his mind, and here also disciplines open out. There is the cult of joy and there are the exercises of M. Coué. Let us suppose that he learns to fill his unconscious with the beautiful, crowding out the ugly, and that

he gets back to a more intimate relation with Nature.

Let us suppose also that children are instructed vividly, dramatically, emotionally in the history of their race; in the world round about them, its order and flux; and, thirdly, in the laws of health and happiness; while, on the other hand, methods are devised for teaching them to use their brains nimbly and confidently. And let not too much time be spent in trying too long to make all the children alike. Equal opportunities by all means; but after experiment a selection of the fitter. We must suppose continued education too, so that more people come to understand what is actually going on. Let us suppose also that the anachronism of war comes to an end. In all this there is nothing whimsical. The chief difficulty is that man does not wish for it hard enough.

Without postulating mutations on a big scale in hereditary "Nature," we see endless possibilities of progressive change by ameliorations in "Nurture." There is no end to what can be done in improving all the surrounding influences that play upon the individual—for that is what *nurture* means; and though the individual's gains may not be entailable, they tend to be registered in the social heri-

tage. There they form an atmosphere or soil in which new constitutional variations in the right direction have a good chance to flourish, and these are transmissible. Moreover, the external heritage forms, in proportion as it is enriched, a safeguard against man's slipping down the rungs of the steep ladder of evolution. This, indeed, is one of the central secrets of progress. Nor can we forget all that *Art* can do, as Emerson so vividly pictured.

Man seems often like a creature whose wings have been smirched with oil or bedraggled with mud, so that it cannot fly. The whole point is that there are gratuitous handicaps which can be got rid of, so as to leave the developing human spirit to go forth with a new freedom on its quest after adventures in the Kingdom of the Spirit.

In this book we have attempted to consider man all round from the scientific point of view. Let us consider very briefly what this means in relation to religion. Science seeks to find out formulæ that will sum up what happens in the world of sense-experience. It tries to make these laws as clear and short and consistent as possible. Its theoretical end is to describe; its practical end is to control. It does not get much beyond saying,

"If this, then that." For it deals with measurable aspects of fractions of reality; it works with "counters," such as corpuscles, which have to be taken as given; its causal descriptions are usually statements of sequence; it cannot get back to beginnings. In short, it is an abstract method of describing the routine of our sensory experience.

Now Religion implies a recognition—practical, emotional, or intellectual—of a higher order of reality than is reached in sense-experience. It sees an Unseen Universe, "the Chariots of God and the Horsemen thereof." Science seeks after the Lowest Common Denominator—such as Matter, Electrons, Energy. Religious concepts are transcendental, those of science are empirical. The aim of Science is description. The aim of religious theory is interpretation. The two may clash in *form*, but in idea they are incommensurable.

Mathematicians speak of an asymptote, a right line that a branch of a curve is ever approaching, but never reaching. Progressive evolution is asymptotic. It will ever be approaching progress as an ideal, but never attaining it. When we think of what is behind us in the way of seeking the truth and finding part of it, of reaching after

beauty and grasping part of it, of longing after goodness and doing a little of it, we are grateful to those who have gone before. But the quests are ours to continue, and therein lies progress.

The evolutionist, looking back on the long lineage leading on to man, is inclined sometimes to hold his breath, for it looks as if there might have been a stoppage, a blind alley; and for many a fine animal race this has been the end. But without haste, without rest, taking millions of years to make a vertebrate, and other millions to make a mammal, the sublime process has continued. Its momentum is behind us still. Why should it stop?

To Richard Yea and Nay, his chaplain, quoting the Psalmist, warningly said, *What is Man?* But the King, lion-hearted to the last, thundered back, *What is Man Not?* That is the distinctively human spirit.

Evolution in the past has been, on the whole, towards integration, towards increasing fullness, freedom, and fitness of life. There has been "a constant if chequered advance." Will it stop?

Man's highest conception, his conception of God, must enlarge as his thoughts are widened. But it is surely interesting that the modern idea of a

God—a God of evolution—brings us back to the God of our fathers, whose name "Jehovah"—the scholars tell us—meant, not "I am that I am," but "I will be what I will be."

APPENDIX

Some Useful Books

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